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EXPERIMENTAL INVESTIGATION OF SHOCK-CELL NOISE REDUCTION FOR **DUAL-STREAM NOZZLES** IN SIMULATED FLIGHT

Contract NAS3-23166

(NASA-CR-168336) EXPERIMENTAL INVESTIGATION OF SHOCK-CELL NOISE REDUCTION FOR DUAL-STREAM NOZZLES IN SIMULATED FLIGHT COMPREHENSIVE DATA REPORT. VOLUME 2: LASER VELOCIMETER DATA, STATIC PRESSURES (General G3/71 13175

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Comprehensive Data Report

VOLUME II

LASER VELOCIMETER DATA, STATIC PRESSURES AND SHADOWGRAPH PHOTOS

K. YAMAMOTO B. A. JANARDAN J. F. BRAUSCH D. J. HOERST A.O. PRICE



National Aeronautics and Space Administration Lewis Research Center 21000 Brookpark Road Cleveland, Ohio Ctt25

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National Aeronautics and Space Administration Lewis Research Center 21000 Brookpark Read Cleveland, Ohio 44135

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VOLUME II LASER VELOCIMETER DATA, STATIC PRESSURES AND SHADOWGRAPH PHOTOS

5.0 LASER VELOCIMETER TESTS

Mean velocity (axial component) and turbulence velocity (axial component) measurements of twenty-five (25) selected flow conditions with six (6) models were performed employing the laser velocimeter. Aerodynamic conditions which define the test points are given in Subsection 5.1. Tabulations which explain the scope of mean velocity traverses and turbulence histogram measurements are also presented in Subsection 5.1. Subsection 5.2 contains tabulated data that describe the actual LV position, the type of traverses and measured mean and turbulent velocities along with copies of the LV mean velocity traces.

5.1 Test Matrix and Aerodynamic Conditions of Test Points

The aerodynamic test conditions of the twenty-five (25) test points are presented in Tables 5-1 through 5-6. The LV test points presented in these tables correspond to the acoustic test points presented in Tables 3.3 through 3.7 of Volume I.

The test points for each model include at least the C-D operating point under both static and simulated flight conditions. Approximately half of the LV tests reported herein were conducted at an elevated outer flow temperature of $T_1^0 \sim 944^0 \text{K}$ (1700°R). The rest were conducted at a lower outer flow temperature of $T_1^0 \sim 470^0 \text{K}$ (850°R). The inner flow temperature was consistently maintained at at $T_1^1 \sim 470^0 \text{K}$ (850°R). Tables 5-7 through 5-34 summarize the scope of the LV tests which consist of at least one of the following:

- 1. Normal axial traverse: along and/or parallel to the nozzle centerline.
- 2. Normal radial traverse*: along the lines vertical to the nozzle centerline in E-W plane (i.e., plane defined by nozzle axis and microphone array).

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^{*}The normal radial traverses were performed only near the exit (on the plug surface) and indicated by the coordinate X'/h where X' is axial distance along the plug surface measured from the outer nozzle lip and h represents step-neight of the outer nozzle (see Tables 5-7 through 5-34).

- 3. Slant axial traverse: along the lines parallel to the slant plug surface.
- 4. Point Histograms: Turbulent velocities were measured at the specified locations during the above mentioned axial, radial and slant traverses.

5.2 Laser Velocimeter Test Data

The measured data for LV test points given in Tables 5-1 through 5-6 are presented as follows:

- o Tabulated data in Tables 5-35 through 5-130. The tables summarize the type of traverse with its graph number, the nistogram number and its location as defined by the position of the LV control volume, the measured mean and turbulent velocities.
- O Copies of the mean velocity traces obtained on the Hewlett-Packard X-Y Plotter. General remarks on the LV mean velocity traces are given in Subsection 5.2.2.

5.2.1 Tabulation of Laser Velocimeter Data

The parameters used in the tabulation of the LV data are defined below.

Pr: Pressure ratio

T_T: Total temperature, OR

 $_{\rm j}^{\rm V}$: Fully expanded jet exit velocity, ft/s

 $V_{a/c}$: Free jet velocity, ft/s

Defined as the equivalent diameter based on total

flow area, inches

h: Defined as the outer nozzle annulus height

measured vertically to the plug surface between the outer wall of the inner nozzle and inner wall of the outer nozzle sleeve tip at the nozzle

throat.

Type of Traverse:

Either a radial, an axial or a slant axial traverse.

Position:

Position of linear voltage displacement transducer

(LVDT), volts.

Graph No:

Identification number of the mean velocity trace.

Histogram

Identification number of the turbulence histogram

No.:

Ref.: Reference point for mean velocity traverse, volts.

X,R,Z:

Coordinates which define the flow-field downstream

of the plug (see figure presented in Table 5-7).

X',R',Z':

Coordinates which define the flow-field on the plug

surface (see figure presented in Table I-7).

SUPERSCRIPT

i: Inner nozzle

O: Outer nozzle

mix: mixed stream

5.2.2 General Remarks on LV Mean Velocity Traces

Copies of the LV mean velocity traces are presented in this section. The information provided on the traces obtained during the mean velocity traverses are explained on a set of sample traces provided in Figures 5-1 and 5-2. Additional general remarks on the mean velocity traces are given below:

o Two kinds of mean velocity traces are available for most of the test points. They are pen-traverse and mini-histogram. During the present LV tests, the mean velocity data measured with the mini-histograms were obtained from the acceptable data samples set to 20. This number of samples yields an estimated 5% error in the mean velocity measurements with a statistical 95% confidence level for a given turbulence intensity of 10%.

- o The "X-Axis" and "Y-Axis" scales are marked clearly on minihistogram traces only. These scales are applicable to the corresponding pen traverse data as both the pen and mini-histogram traces for a given traverse were obtained at the same time. Also, all the traces have their scale factors marked in the plotidentification block. It is suggested that for analyses purposes the mini-histogram plots be used as they are more distinct.
- o The axial mean velocity (V-component) presented in the traces is normalized either by the ideally expanded outer-stream exit velocity (V_j^0) or by the ideally expanded mixed stream velocity (V_j^{mix}) which is defined in Section 3.0 of Volume I.
- o The traverse distance is normalized either by the outer annulus height (n) or by the equivalent diameter ($D_{\rm eq}$).

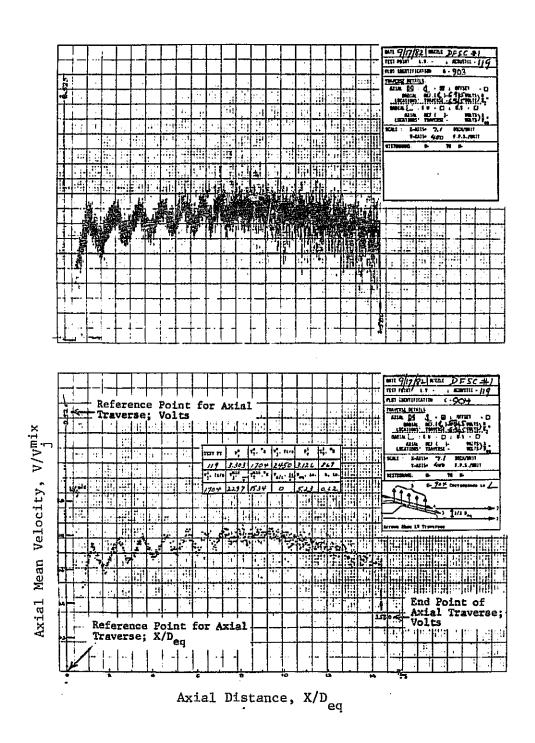
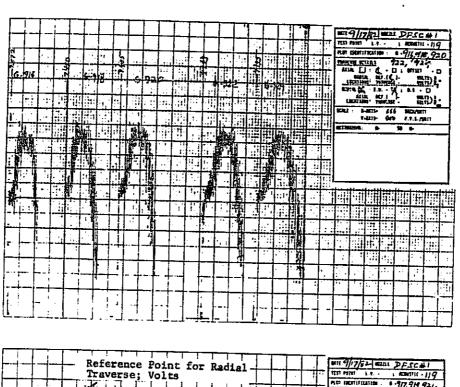
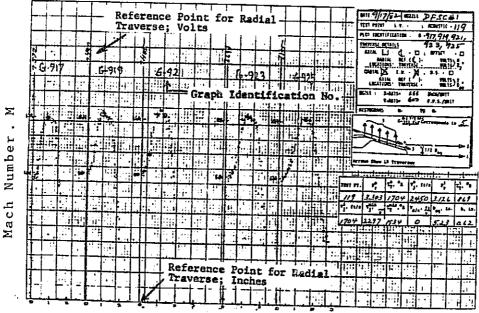


Figure 5-1. Sample Traces for Axial Mean Velocity Traverses.





Radial Distance from Plug Surface, Inches

Figure 5-2. Sample Traces for Radial Mean Velocity Traverses.

Baseline Coannular Convergent Plug Nozzle (Truncated Plug).

Test Point	P ^o r	T _T ^o	v ^o j (ft/s)	P _r	T _T i (OR)	v ⁱ (ft/s)	v ^{mix} j (ft/s)	T ^{mix} T	V _{a/c} (ft/s)	Remarks
119	3.303	1704	2450	3.126	869	1704	2297	1534	0	
120	3.321	1713	2461	3.123	875	1709	2308	1543	400	
1119	3.434	861	1754	3.144	855	1694	1744	860	0	Correspond to C-D Design Point
1120	3.402	884	1772	3.140	858	1696	1759	880	400	
101	_	-	-	3.140	859	1696	_	***	0	No Outer Stream
	•									

P_r = Pressure Ratio

 $T^{T} = Total Temperature$

 V_{j} = Fully Expanded Jet Exit Velocity

 $V_{a/c}$ = Free Jet Velocity

Superscripts

o = Outer Stream

i = Inner Stream

mix = Mixed Stream

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Test Point	p ^o r	T _T ^o	v _j	P _r	T ¹ T	v _j	v ^{mix}	T ^{mix}	V _{a/c}	Remai ks
		(^O R)	(ft/s)		(°R)	(ft/s)	(ft/s)	(°R)	(ft/s)	·
219	3.313	1681	2436	3.130	859	1695	2297	1494	0	
220	3.318	1700	2451	3.129	852	1688	2308	1506	400	
1219	3.403	846	1733	3.131	842	1678	1744	845	С	Correspond to C-D Design Point
1220	3.409	873	1762	3.130	840	1677	1759	867	400	
201	_	-	_	3.141	855	1693	-	-	0	No Outer Stream
			1		<u> </u>	<u> </u>	<u> </u>			

 P_r = Pressure Ratio

 T^{T} = Total Temperature

 V_{j} = Fully Expanded Jet Exit Velocity

 $V_{a/c}$ = Free Jet Velocity

Superscripts

o = Outer Stream

i = Inner Stream

mix = Mixed Stream

ORIGINAL PACE IS

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Outer/Inner C-D Coannular Plug Nozzle (Extended Plug).

Test Point	P°	TT	v ^o j	P _r ⁱ	T _T ¹	v _j	v ^{mix}	T _T ^{mix}	V _{a/c}	Remarks
		(^O R)	(ft/s)		(°R)	(ft/s)	(ft/s)	(° _R)	(ft/s)	
319	3.317	1702	2453	3.128	872	1707	2282	1513	0	
320	3.318	1704	2455	3.126	866	1701	2282	1513	400	
1319	3.389	870	1755	3.122	847	1681	1742	866	0	Correspont to C-D Desogn Point
1320	3.416	864	1754	3.126	856	1691	1743	863	400	
301	-	-	_	3.128	852	1689	-	-	0	No Outer Stream
		70.000.000								

P_r = Pressure Ratio

 T^{T} = Total Temperature

 V_{j} = Fully Expanded Jet Exit Velocity

 $V_{a/c}$ = Free Jet Velocity

Superscripts

o = Outer Stream

i = Inner Stream

mix = Mixed Stream

ORIGINAL PACE IS

The street to be the street of the street of

Outer/Inner Flowpaths.

		i -	,	timer 110,		т				
Test Point	P ^o r	TT	v ^o	P _r i	T _T	vj	v ^{mix} j	T _T mix	V _{a/c}	Remarks
		(°R)	(ft/s)		(°R)	(ft/s)	(ft/s)	(°R)	(ft/s)	
415	3.136	1692	2396	2.918	863	1654	2243	1521	0	
416	3.118	1699	2396	2.922	873	1664	2244	1529	400	
1415	3.202	853	1703	2.910	855	1644	1694	853	0	Correspond to C-D Design Point
1416	3.216	878	1730	2.909	847	1636	1716	873	400	
 					<u> </u>					
		i								

P_r = Pressure Ratio

 T^{T} = Total Temperature

 V_{\dagger} = Fully Expanded Jet Exit Velocity

 $V_{a/c}$ = Free Jet Velocity

Superscripts

o = Outer Stream

i = Inner Stream

mix = Mixed Stream

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53 53 8

Test Point	P ^o r	T _T O	v ^o j (ft/s)	P ⁱ r	T ⁱ T	v ⁱ i (ft/s)	V ^{mix} (ft/s)	TTT (OR)	V _{a/c} (ft/s)	Remarks
51.1	3.128	1709	2406	2.918	859	1649	2246	1530	0	
512	3.120	1651	2361	2.910	848	1637	2209	1483	400	Correspond to C-D
1511	3.212	855	1707	2.911	848	1638	1696	854	0	Design Point
1514	3.214	897	1749	2.919	865	1656	1734	892	400	

 P_r = Pressure Ratio

T^T = Total Temperature

V = Fully Expanded Jet Exit Velocity

 $V_{a/c}$ = Free Jet Velocity

Superscripts

o = Outer Stream

i = Inner Stream

mix = Mixed Stream

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TABLE 5-6. AERODYNAMIC CONDITIONS OF LV TEST POINTS OF DFSC-6.

Convergent Coannular Nozzle with a Sharp Tip Plug.

Berger British

Test Point	P°r	T _T ^o	v ^o j (ft/s)	P _r	T _T i (°R)	v _j i (ft/s)	V ^{mix} (ft/s)	TTT (OR)	V _{a/c} (ft/s)	Remarks
	 				`,	(10,0)	(10/0/	\ K/	(10/5)	
619	3.302	1689	2439	3.119	871	1705	2289	1523	0	Correspond to C-D
620	3.317	1710	2459	3.145	868	1707	2304	1538	400	Design Point
649*	3.335	1687	2446	1.797	1348	1585	2356	1652	0	Outer Stream Supersonic Inner Stream Subsonic
1619	3.397	871	1757	3.122	864	1698	1748	870	0	Correct to C. P.
1620	3.412	875	1764	3.130	867	1703	1754	874	400	Correspont to C-D Design Point
••••								·		

 P_r = Pressure Ratio

 T^{T} = Total Temperature

 V_{j} = Fully Expanded Jet Exit Velocity

 $V_{a/c}$ = Free Jet Velocity

Superscripts

o = Outer Stream

i = Inner Stream

mix = Mixed Stream

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^{*} Matching Acoustic Test Point is Designated as 7619

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS TABLE 5-7.

DFSC-1; Baseline Coannular Convergent Nozzle (Truncated Plug). MODEL

TEST POINT 119

Type of Syst.	Type of Traverse	MEAN VELO	CITY TRAVERSES	TURBULENCE HISTOGRAMS		
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
		$R/D_{eq} = 0.0$	903-904			
erse	AXIAL	= 0.5	905-905A	18	2111-2128	
Traverse						
Norma1	RADIAL	$X'/h^0 = to$ 16.11	906 to 925			
9	AXIAL	R'/h' = **	926-927			
nt ver		= *	930-931	16	2129-2144	
Slant Traverse		= ***	928-929			
		¥ =				

* Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line

*** Along Outer Stream Centerline

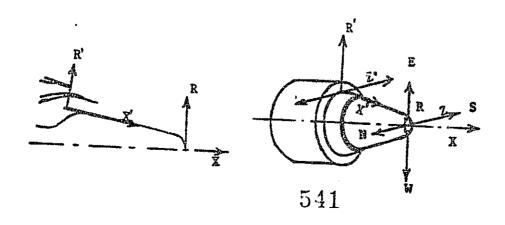
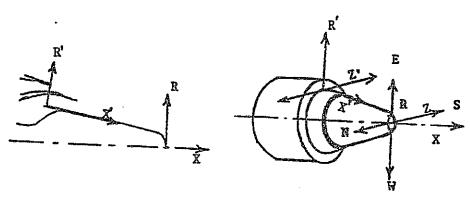


TABLE 5-8. SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC-1; Baseline Communar Convergent Nozzle (Truncated Plug).

Type of Syst.	Type of Traverse	MEAN VELOC	CITY TRAVERSES	TURBULENCE HISTOGRAMS		
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
		$R/D_{eq} = 0.0$	875-876			
9	AXIAL	= 0.5	877-878	16	2095-2110	
Traverse						
Normal T	RADIAL	0.11 X'/h = to 16.11	879-898			
8	AXIAL	R'/h' = **	899-900			
nt ver		= #	932-933	16	2145-2160	
Slant Traverse	ļ	12 六大大	901-902			
	İ	* =				

^{*} Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line ** Along Outer Stream Centerline



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SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS TABLE 5-9.

DFSC-1; Baseline Coannular Convergent Nozzle (Truncated Plug). MODEL

TEST POINT 1119

Type of Syst.	Type of Traverse	MEAN VELOC	ITY TRAVERSES	TURBULENCE HISTOGRAMS		
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
		$R/D_{eq} = 0.0$	801,825			
9	AYIAL	= 0.5	803,826	24	2000-2023	
Traverse		·	.1			
Normal 1	RADIAL	0.18 X'/h = to 16.29	805-824			
	AXIAL	R'/h° = **	827			
nt vers		= ***	828			
Slant Traverse		= *	829-830	22	2024-2045	
		<u> </u>				

* Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line *** Along Outer Stream Centerline

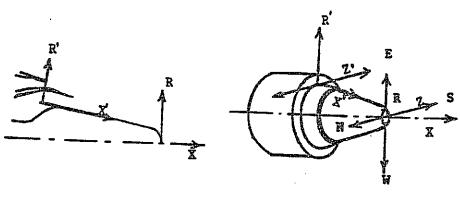


TABLE 5-10.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC- 1; Baseline Coannular Convergent Nozzle (Truncated Plug). MODEL

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
		$R/D_{eq} = 0.0$	836-837		
586	AXIAL	= 0.5	838-839	2	2046-2072
Traverse			:		
Normal 1	RADIAL	$X^{r}/h^{c} = 0.18$ 10.92	840-853		
Se	AXIAL	R*/h° = **	854-855		
Slant Traverse		= ***	867-868		······································
	ļ	= *	869-870	22	2073-2094
]		Ý =			

^{*} Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line ** Along Outer Stream Centerline

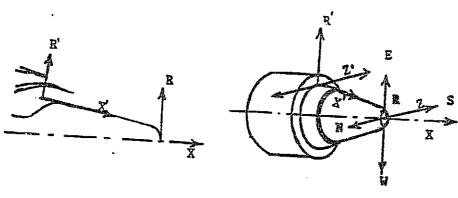


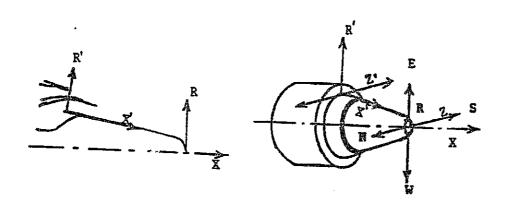
TABLE 5-11.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC-1; Baseline Coannular Convergent Nozzle (Truncated Plug).

Type of Syst.	Type of Traverse	MEAN VELOC	ITY TRAVERSES	TURBULENCE HISTOGRAMS	
-		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
Traverse	ANIAL	R/D _{eq} = 0.0	834~835		
Normal Tr	RADIAL	X/D _{eq} = to	1		
Slant Traverse	AXIAL	R'/h° = ****	831-832 833		

^{***} Along Outer Stream Centerline



^{*} Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line

TABLE 5-12.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC-2; Coannular C-D Nozzle (Truncated Plug).

TEST POINT 219

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
	İ	$R/D_{eq} = 0.0$	975-976		
erse	AMIAL	= 0.5	977-978	16	2200-2215
Traverse		—	1		
Normal Tr	RADIAL	0.09 X'/h = to 10.28	979-998		
36	AXIAL	R'/h° = **	1059-1060		
Slant Traverse		= *	1063-1064	11	2251-2261
		= ***	1061-1062		
O) F		; =			

* Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line *** Along Outer Stream Centerline

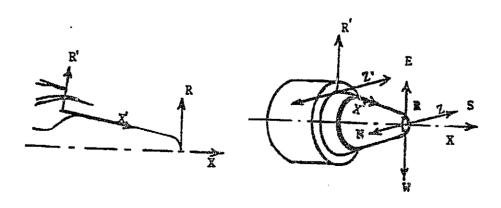


TABLE 5-13.

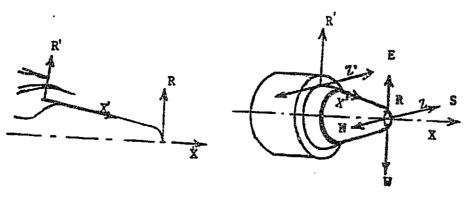
SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC-2; Coannular C-D Nozzle (Truncated Plug).

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
		$R/D_{eq} = 0.0$	999-1000		
se	ANIAL	= 0.5	1001-1002	15	2216-2230
Traverse					
Normal 1	RADIAL	0.09 X'/h° = to 10.28	1003-1022		
Se	AXIAL	R ₁ /h = **	1065-1066		
ver		; = *	1069-1070	11	2262-2272
Slant Traverse		= ***	1067-1068		
		+ =			

^{*} Along Outer Nozzle Lip-Line

^{**} Along Inner Nozzle Lip-Line *** Along Outer Stream Centerline



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TABLE 5-14. SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC- 2; Coannular C-D Nozzle (Truncated Plug).

TEST POINT 1219

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
		$R/D_{eq} = 0.0$	936,938		
بۇ	AMIAL	0.5	939-940	22	2161-2182
Traverse					
Normal I	RADIAL	0.09 X'/h° = to 10.28	941-972		
e,	AXIAL	R'/h° = **	1053-1054		
ers		- *	1057-1058	19	2232-2250
Slant Traverse		= ***	1055-1056		
3, [-		=			

* Along Outer Nozzle Lip-Line
** Along Inner Nozzle Lip-Line
*** Along Outer Stream Centerline

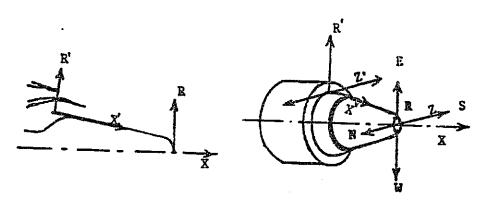


TABLE 5-15. SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC-2; Coannular C-D Nozzle (Truncated Plug).

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
	ļ	$R/D_{eq} = 0.0$	1023-1024		
se	ANIAL	= 0.5	1025-1026	16	2216- 2231
Traverse					
Normal 1	RADIAL	0.09 X'/h = to 10.28	1027-1046		
se	AXIAL	R'/h° = **	1071-1072		
Slant Traverse		= *	1075-1076	20	2273-2292
		= **	1073-1074		
[-		=			

^{*} Along Outer Nozzle Lip-Line

^{**} Along Inner Nozzle Lip-Line

** Along Outer Stream Centerline

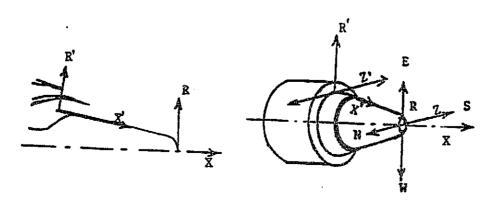


TABLE 5-16.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC- 2; Coannular C-D Nozzle (Truncated Plug). MODEL

TEST POINT 201

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
Traverse	ANIAL	R/D = = = =		AUSTI 101	
Normal Tra	RADIAL	X/D _{eq} = to			
Slant Traverse	AXIAL	R*/h° = **** = =	1049-1050		

* Along Outer Nozzle Lip-Line * Along Inner Nozzle Lip-Line

*** Along Outer Stream Centerline

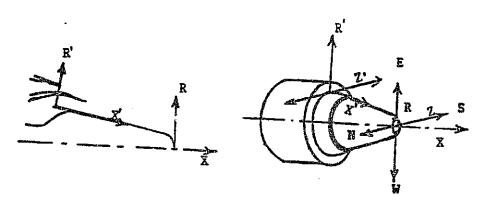


TABLE 5-17. SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC-3; Coannular C-D Nozzle (Extended Plug).

TEST POINT 319

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
		$R/D_{eq} = 0.0$	1091-1092		
•	AMIAL	= 0.5	1093-1094		······································
Traverse					
Normal T	RADIAL	X/D _{eq} = to			
j.	AXIAL	R'/h° = **	1095-1096		
ıt 'ers		= *	1099-1100		
Slant Traverse		= ***	1097-1098		
o F		i i =			

* Along Outer Nozzle Lip-Line

** Along Inner Nozzle Lip-Line

*** Along Outer Stream Centerline

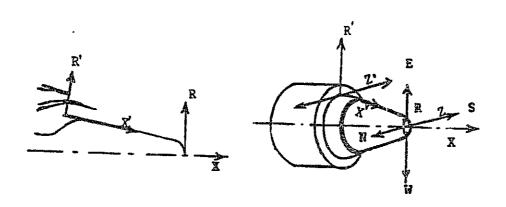


TABLE 5-18.

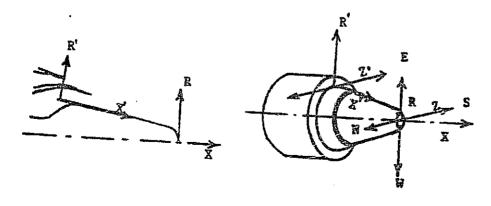
SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC-3; Coannular C-D Nozzle (Extended Plug)

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
		$R/D_{eq} = 0.0$	1087-1088		
Traverse	ANIAL	= 0.5	1089~1090		
Normal Tr	RADIAL	X/D _{eq} = to			
Slant Traverse	ANIAL	R'/h = = = = = = = = = = = = = = = = = = =			

^{*} Along Outer Nozzle Lip-Line

^{***} Along Outer Stream Centerline



^{**} Along Inner Nozzle Lip-Line

TABLE 5-19. SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC- 3; Coannular C-D Nozzle (Extended Plug). MODEL

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
	j -	$R/D_{eq} = 0.0$	1079-1080		
rse	AXIĄL	= 0.5	1081-1082		
Traverse					
Normal	RADIAL	X/D _{eq} = to	; ; f		
Slant Traverse	AXIAL	R'/h° =		10.74°	
Sla Tra		=			

^{*} Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line *** Along Outer Stream Centerline

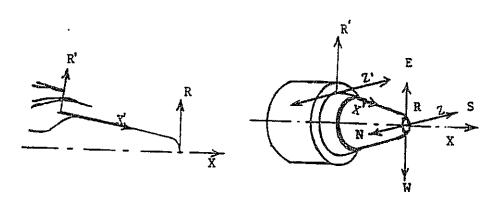


TABLE 5-20.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC-3; Coannular C-D Nozzle (Extended Plug). MODEL

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
	j	$R/D_{eq} = 0.0$	1083-1084		
Traverse	AMIAL	= 0.5	1085-1086		
Normal T	RADIAL	X/D _{eq} = to			-
Slant Traverse	AXIAL	R'/h° = = = = = = = = = = = = = = = = = = =			

^{*} Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line ** Along Outer Stream Centerline

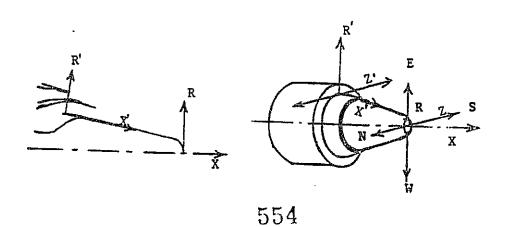


TABLE 5-21.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC- 3; Coannular C-D Nozzle (Extended Plug).

TEST POINT 301

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
Traverse	ANIAL	R/D _{eq} = 0.0	1077-1078		
Normal T	RADIAL	X/D _{eq} = to			
Slant Traverso	ANIAL	R'/h = = = = = = = = = = = = = = = = = = =			

* Along Outer Nozzle Lip-Line

Along Inner Nozzle Lip-Line Along Outer Stream Centerline

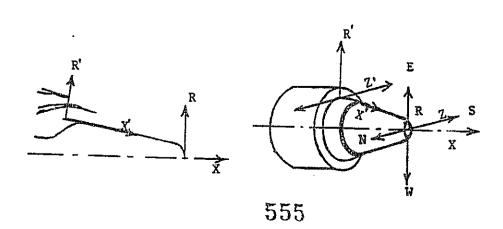


TABLE 5-22.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC-4; Coannular Suppressor Convergent Nozzle.

TEST POINT 415

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
Normal Traverse	AXIAL	$R/D_{eq} = 0.0$	1129-1130	- DOUBLION	
		= 0.5	1131-1132	18	2317-2334
	RADIAL	$\begin{array}{cc} 0.05 \\ X^{\dagger}/h^{\circ} = & \text{to} \\ 7.24 \end{array}$	1133 to 1152		
Slant Traverse	AXIAL	$R \cdot /h^{\circ} = **$	1209-1210		
		*	1153-1154	20	2335-2354
		= ***	1207-1208		
		∮ =			

* Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line

*** Along Outer Stream Centerline

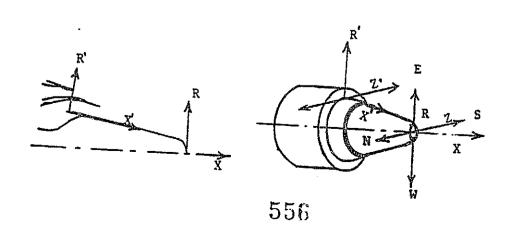


TABLE 5-23.

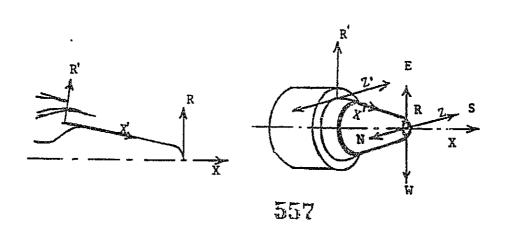
SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC- 4; Coannular Suppressor Convergent Nozzle. MODEL

TEST POINT 416

Type of Syst.	Type of Traverse	MEAN VELOCITY TRAVERSES		TURBULENCE HISTOGRAMS	
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.
Normal Traverse	ANIAL	$R/D_{ec} = 0.0$	1183-1184		
		0.5	1185-1186	17	2377-2393
	RADIAL	$X^{\dagger}/h^{\circ} = 0.05$ 0.05 7.24	1187 to 1206		
Slant Traverse	AXIAL	R'/h° = **	1227-1228		
		= *	1225-1226	18	2434-2451
		= ***	1223-1224		
		i =		1	

* Along Outer Nozzle Lip-Line
** Along Inner Nozzle Lip-Line
*** Along Outer Stream Centerline



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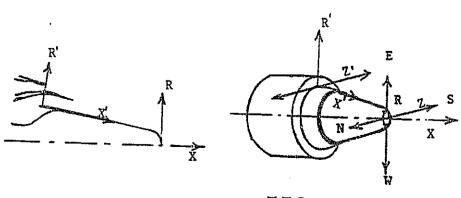
TABLE 5-24.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC-4; Coannular Suppressor Convergent Nozzle. MODEL

Type of Syst.	Type of Traverse	MEAN VELOC	CITY TRAVERSES	TURBULENCE HISTOGRAMS		
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
! !		$R/D_{eq} = 0.0$	1101-1102			
Traverse	ANIAL	= 0.5	1103-1104	21	2296-2316	
Normal T	RADIAL	$X'/h^0 = to$ 7.62	1105 to 1126	,		
ė,	AXIAL	R'/h° = **	1215-1216			
ıt 7ers		; = *	1213-1214	20	2394-2413	
Slant Traverse		= ***	1211-1212			

Along Outer Stream Centerline



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^{*} Along Outer Nozzle Lip-Line
** Along Inner Nozzle Lip-Line

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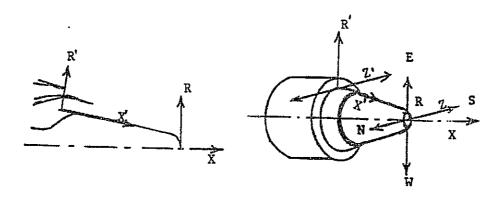
TABLE 5-25. SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC-4; Coannular Suppressor Convergent Nozzle.

Type of Syst.	Type of Traverse	MEAN VELOC	ITY TRAVERSES	TURBULENCE HISTOGRAMS			
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.		
		$R/D_{eq} = 0.0$	1157-1158				
380	ANIAL	= 0.5	1159-1160	21	2356-2376		
Traverse							
Normal 7	RADIAL	0.05 X'/h° = to 7.24	1161 to 1180				
Se	AXIAL	R ' /h' = **	1221-1222				
nt Vet:		*	1219-1220	20	2414-2433		
Slant Traverse		= ***	1217-1218				
· · ·		+ =					

^{*} Along Outer Nozzle Lip-Line

^{***} Along Outer Stream Centerline



^{**} Along Inner Nozzle Lip-Line

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TABLE 5-26.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC- 5; Coannular Suppressor C-D Nozzle.

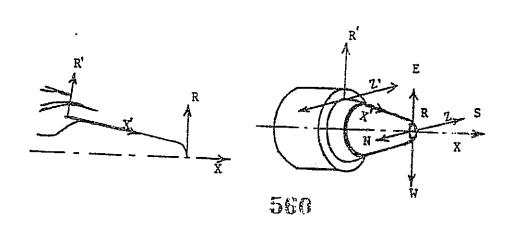
TEST POINT 511

Type of Syst.	Type of Traverse	MEAN VELOC	ITY TRAVERSES	TURBULENCE HISTOGRAMS		
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
		$R/D_{ec} = 0.0$	1239-1240			
s. e	ANIAL 	= 0.5	1241-1242	13	2474-2488	
Normal Traverse						
	RADIAL	$X/D_{eq} = \frac{-1.65}{to}$	1243-1260			
Se	AXIAL	R'/h° = ***	2567-2568			
nt ver	,	= *	2569-2570	18	2588-2605	
Slant Traverse		= **	2571-2572			
		h ==				

* Along Outer Nozzle Lip-Line

** Along Inner Nozzle Lip-Line

*** Along Outer Stream Centerline



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TABLE 5-27.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

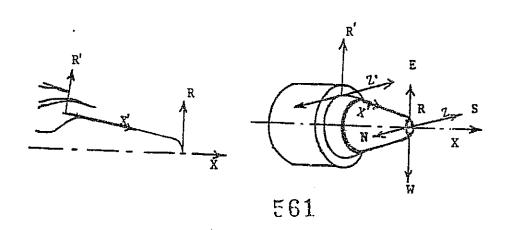
MODEL DFSC- 5; Coannular Suppressor C-D Nozzle.

TEST POINT 512

Type of Syst.	Type of Traverse	MEAN VELOC	TTY TRAVERSES	TURBULENCE HISTOGRAMS		
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
		$R/D_{eq} = 0.0$	2531-2532			
Traverse	ANIAL	= 0.5	2533-2534	15	2511-2525	
					7	
Norma1	RADIAL	$x'/h^0 = to$ 6.81	- 2535-2554			
96	AXIAL	R'/h' = ***	2555-2556			
Slant Traverse		; = *	2557~2558	18	2526-2543	
S.		+ =				

* Along Outer Nozzle Lip-Line

** Along Inner Nozzle Lip-Line
*** Along Outer Stream Centerline



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TABLE 5-28.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC- 5; Coannular Suppressor C-D Nozzle. MODEL

TEST POINT 1511

Type of Syst.	Type of Traverse	MEAN VELOCI	TTY TRAVERSES	TURBULENCE HISTOGRAMS		
•		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
		$R/D_{eq} = 0.0$	1215-1216			
Traverse	AXIAL	0.5	1217-1218	21	2453-2473	
Normal T	RADIAL	X'/h° = to 6.80	1219-1238			
9,	AXIAL	R'/h° = ***	2563-2564			
Slant Traverse		= *	2565-2566	23	2565-2587	
Slant		=				
77 [4) =				

* Along Outer Nozzle Lip-Line

** Along Inner Nozzle Lip-Line *** Along Outer Stream Centerline

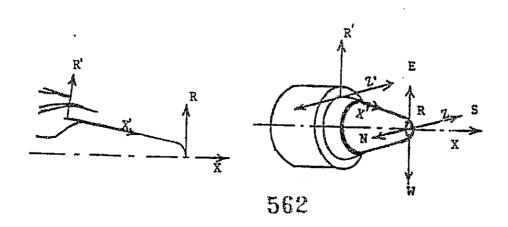
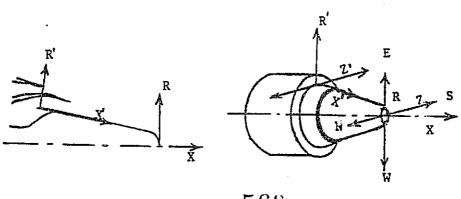


TABLE 5-29.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC-5; Coannular Suppressor C-D Nozzle.

Type of Syst.	Type of Traverse	MEAN VELOC	ITY TRAVERSES	TURBULENCE HISTOGRAMS		
	116.6156	MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
		$R/D_{eq} = 0.0$	1261-1262			
Traverse	ANIAL	= 0.5	1263-1264	22	2489-2510	
Normal Tr	RADIAL	0.05 x'/h° = to 6.81	2511 to 2530			
<u>o</u>	AXIAL	R'/h' = ***	2559-2560			
ıt 'ers		= *	2561-2562	21	2544-2564	
Slant Traverse		=				
S		† =				



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^{*} Along Outer Nozzle Lip-Line
** Along Inner Nozzle Lip-Line
*** Along Outer Stream Centerline

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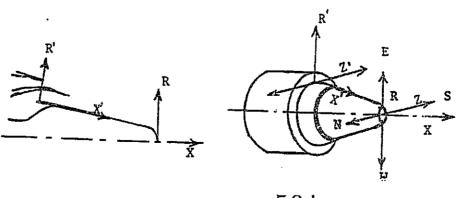
TABLE 5-30.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC- 6; Coannular Convergent Nozzle (Extended Plug). MODEL

Type of Syst.	Type of Traverse	MEAN VELOC	ITY TRAVERSES	TURBULENCE HISTOGRAMS			
,		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.		
		$R/D_{eq} = 0.0$	3016-3017				
Traverse	ANIAL	= 0.25	3018-3019		· · · · · · · · · · · · · · · · · · ·		
		0.5	3020-3021	16	3001-3016		
		Ψ	!				
Normal '	RADIAL	X/D _{eq} = to					
Slant Traverse	AXIAL	R ₁ /h ⁰ = = = = = = = = = = = = = = = = = = =					

Along Outer Stream Centerline



^{*} Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line

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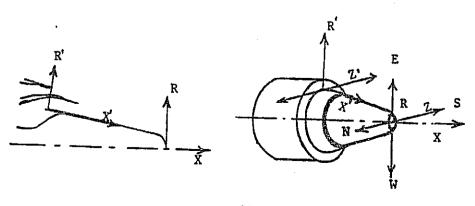
TABLE 5-31. SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

MODEL DFSC-6; Coannular Convergent Nozzle (Extended Plug).

Type of Syst.	Type of Traverse	MEAN VELOC	ITY TRAVERSES	TURBULENCE HISTOGRAMS		
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
Traverse	ANIAL	R/D _{eq} = 0.5	3010-3011			
Normal Tr	RADIAL	X/D _{eq} = to	i			
Slant Traverse	AXIAL	R'/h° = *	3012-3013			

^{*} Along Outer Nozzle Lip-Line ** Along Inner Nozzle Lip-Line

^{***} Along Outer Stream Centerline



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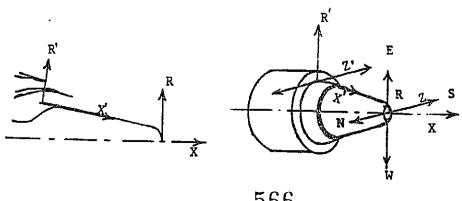
TABLE 5-32. SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC- 6: Coannular Convergen Nozzle (Extended Plug) MODEL

Type of Syst.	Type of Traverse	MEAN VELOC	ITY TRAVERSES	TURBULENCE HISTOGRAMS		
		MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
		$R/D_{eq} = 0.0$	3022-3023			
d)	AMIAL	= 0.25	3024-3025			
Normal Traverse		0.5	3026-3027	12	3017-3028	
	RADIAL	X/D _{eq} = to				
Slant Traverse	AXIAL	R*/h =				
<u> </u>		=				

Along Outer Nozzle Lip-Line

Along Outer Stream Centerline



Along Inner Nozzle Lip-Line

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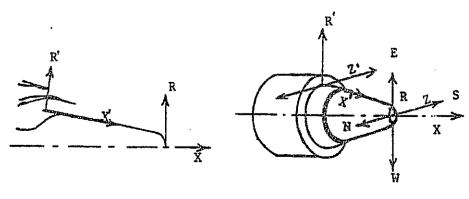
TABLE 5-33.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC- 6; Coannular Convergent Nozzle (Extended Plug). MODEL

Type of Syst.	Type of	MEAN VELOC	ITY TRAVERSES	TURBULENCE HISTOGRAMS		
Syst.	Traverse	MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.	
		$R/D_{eq} = 0.0$	3000-3001			
	AMIAL	= 0.5	3002-3003			
Traverse						
Normal T	RADIAL	x/D _{eq} = to				
Slant Traverse	AXIAL	R'/h° = =				
Slant Trave		V =				

^{*} Along Outer Nozzle Lip-Line * Along Inner Nozzle Lip-Line Along Outer Stream Centerline



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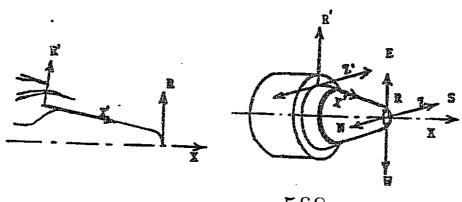
TABLE 5-34.

SCOPE OF LV MEAN VELOCITY TRAVERSES AND POINT TURBULENCE HISTOGRAM LOCATIONS

DFSC- 6; Coannular Convergent Nozzle (Extended Plug). MODEL

Type of Syst.	Type of Traverse	MEAN VELOCI	TY TRAVERSES	TURBULENCE HISTOGRAMS			
	llavetse	MEASURED FLOW REGIONS	GRAPH ID. NUMBER	NO. OF HISTO. & MEASURED LOCATION	HISTOGRAM NO.		
		$R/D_{eq} = 0.0$	3004-3005				
Traverse	AXIAL	0.5	3006-3007				
Normal Tr	RADIAL	X/D _{eq} = to					
Slant Traverse	AXIAL	R/h = = = = = = = = = = = = = = = = = = =					

^{*} Along Outer Nozzle Lip-Line



Along Inner Nozzle Lip-Line Along Outer Stream Centerline

ROOK CUALT

МО	ODEL	TEST PT.	P ^o r	Tronga	V ^o , ft/s	Pr	T _T , o _R	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
		119	3.303	1704	2450	3.126	8-69	1704	22 97	1534	0	C.23	0.62

Gra No	ph Hist No.		Type of	Slant	Positio Axial	•				Slant Ax. Po	35.	Axial Posit.	Pac	it.	Mean Velocity	Turb. Velocity	Remarks
		235,043	Traverse	Axlal	AXIƏI		EM		NS	X¹/h°		X/D _{eq}	RV C	eq	Ft/Sec	Ft/Sec	Nendi Ka
			REE	•	1.527	6.	96r	13.	866	PLUG	7	11P					
90.			<u>ax</u>										0	.0			
90l	/]				•		<u> </u>		-		Ļ		ļ	J	•	•	LAX TRAIRS ON YOU O AND
905		_			*	7.6	578				L	•	0.	5	•		O.S. PESPETIVELY
905	<u> </u>	4								/					•		
	2///				V.E3 T							0.0			2292	96	
	<u> 21/2</u>	<u>.</u>			7.082							051			2/27	168	
	211	4			2031						-	1.06			5581	164	
	2114	_			1.665					/		1.60			2086	246	
	717	_i_			1.685	<u> </u>				/	-	2.14			2202	207	
	2116	7			1.725			-				2.68			2072	265	HISTO. HEASURED AXIALLY
	2117	¥													#00	-	PHISTO, HEASURED AXIALLY ON 1/Dig = 0.5:
	2118	7			1.800							3.69			1994	265	
	2//9	7		 	1.765					/	_	3.22			2053	230	
	2/20				1.865					<i> </i>	_	4.30			1942	241	
	2/2/	***	10UC10		1.885	\		A STATE OF THE PERSON NAMED IN	/			4.84	J		1861	270	

NOMENCLATURE

P_r * Pressure Ratio

V_i = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

 $V_{e/c}$ ~ Free Jet Velocity

h * Annulus Height

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	,						,							3 =
	MODEL	TEST PT.	P°r	Trongar	V ^o , ft/s	P ⁱ r	T _T , o _R	V _j , ft/s	V ^{mix} ft/s	TT, R	$V_{a/c}, \frac{ft}{s}$		h, in.	PAGE
ហ		119	3.303	1704	2450	3.126	869	1704	2297	1534	0	5.23	0.62	Zm

				aydda Tawlad o'i Bayl yn a s Padaga.	4			1			····	
Graph	Histo	Type			(Volts)	Slant		Radial	Mean	Turb.	
No.	₩o.	of	Slant	Axial	EW	NS	Ax. Pos.	Posit.	Posit.	Velocity	Velocity	Remarks
		Traverse	AXIAI			1	፠ '76°	X/D _{eq}	R/D _{eq}	Ft/Sec	Ft/Sec	
			1						alle Piller (cross) av			
<u> </u>	2/23	_AX		1.925	7.678	13.886	<u> </u>	5.39	0.5	1878	239	
	2123			1.965				5.93		1727	257	
	2124			2.065				7.01		1698	280	
	2125			2./25				8.09		1524	295	HISTO. HEASURED AXIALLY
	2126	,		2.205				9.17		1484	288	LOW TOUCE 0.5.
	2127			2,2%				10.26		1420	274	
	2128	V	<i>j</i>	2,365	J			11.34	V	1360	284	The state of the s
		eee	0.500	1.361			DUTERNO	erce d	or.	•	•	
906		RANAL	0.530	`	٠		0.11		•	•	•	
907			↓	•	•	,	↓ .		•	4	•	
908			€.06℃	•	•		1.79	<i>[</i>	•	•	•	
909			J	,	•		↓ I		•	•	•	RADIAL TRAVES UEAR
910			1.500	,	•		3,58		•	•	•	1-135 B2550N
911			Ų.				b			٠	•	
9/2			هه <u>ن ت</u>	•	•		5.37		•	•	·	
913	and the second second	V	Ţ		*	V	j	7				

NOMENCLATURE

P = Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

 $D_{eq} = Equivalent Diameter$

T_T = Total Temperature

 $V_{a/c}$ = Free Jet Velocity

- بحوالات

TEST DATE 9/17/82

'n, in. V_{j}^{i} , ft/s V_{j}^{mix} ft/s T_{T}^{mix} R v^o, ft/s T_T^i , O_R $V_{a/c}, \frac{ft}{s} D_{eq}, in.$ $P_{\mathbf{r}}^{\mathbf{o}}$ MODEL TEST PT. 57 2450 1534 1704 869 1704 5.23 0.62 2297 3.126 119 3.303

No.	Histo No.	of Traverse	Slant	Position Axial	EM) ผ	IS	Slant Ax. Pos. X'/h°	Posit	Radial Posit. KVD _{eq}			Remarks
914		PAPIAL	3.700	•	•	13.8	66	7.16		•	,		
218			V	•	•			J.		•	•	`	
916			3.000	•	•			8.95	j	•		,	
9, 1			Ų	٠	•			<u> </u>	,	•		•	
918			3.500	•	•			10.74	i				
919			J		•			Į.			•	•	RODUL TRAVES NEAR
920			4.000	•	•			12.53		•	•		NORTH EXIT
921			J	•	•			J		•	•	•	
922			4.500	•	٠			14.32		•	•	•	
923			V	•	•		·	J.					
924			Ç.660	•	•			16.11		•		•	Annual Maria
975		¥	₽	•	•	V		J	1	•		•	
								1					

NOMENCLATURE

P_r = Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

D == Equivalent Diameter

T_T = [⊤]otal Temperature

 $V_{a/c}$ = Free Jet Velocity

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/17/82

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	MODEL	TEST PT.	P° r	To, or	V ^o , ft/s	P ⁱ r	T _T , o _R	V ⁱ , ft/s	v ^{mix} ft/s	TT OR	V _{a/c} , ft	D _{eq} , in.	h, in.	
572		119	3.303	1704	2450	3.126	869	1704	2297	1534	0	<u>c.23</u>	0.62	

	Histo	Type of	Slant		n (Volts	2	Slant	Axial	Radial	Mean	Turb. Velocity	Remarks
No.	No.	or Traverse		Axial	EM	NS	Ax. Pos.	X/D _{eq}	R/D _{eq}	Ft/Sec	Ft/Sec	Nembi Ka
er en van de en en en en en en en en en en en en en		REE_	0.500	[02.\	6.245	13.866	PLUG T	م آ				
926		SCANT AX	-		5,624						,	
927			•		J					,	•	SLANTAX. TRAVES, ON ZUNGK
930					822.2						•	NOBLE LIP-LINE, AND
931			•									OUTER ASSOCE LIP-LINE,
	2129		0.75				0.90			2023	174	RESPECTIVELY.
	2130		1.00				1.79			2327	277	
	2131		1.25				2.69			2 <u>020</u>	257	
	2/12		1.50				3.58			2372	133	
	2133		1.75				468			2428	1/2	
	2/34		2.60				J.37			2574	147	HISTO, MEASURED BEIRLY
	2135		2.25				6.27			2111	163	ON OUTERNOTHE LIP-LINE
	2/36		2.50				7.16			2242	58	
	2/37		2.75				8.06			2294	57	
	2138		3.00				8.95			224/	61	
	2139		3.25	V	V	₩	9.84	1		2313	58	

NOMENCLATURE

P_r = Pressure Ratio

V = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V = Free Jet Velocity

TABLE 5-39

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/17/82

	MODEL	TEST PT	P _r	TT	, or vo	, ft/s	Pr r	T _T , o _R	V _j , ft/s	V ^{mix} ft/s	TT, R	$v_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.	<u>\$</u> 89
57		119	3.30	3 /7	04 2	650	3.126	869	1704	2297	1534	0	5.23	0.62	J
Gra No	ph Histo . No.	Type of Traverse	Slant	Positio Axial	n (Volts	s) NS	Slant Ax. F X'7h	os Posi	Radial t. Posit.	Hean Velocity Ft/Sec	Turb. Velocity Ft/Sec		Remarks	nacharaka coline potopalacy (selfta	
	2140	SLANT	3.75		3.558	13.86	6 11.6	4		2356	47				
	2141		425				136	3	/ /	2361	83				····
	2142		4.75				15.2	2		2261	129	7 141570	. MEASUR	SO AXIAL	LY_
	2143		5.00				16.1			2173	141	100/	007ER NGZ	PLE 110-	UNE
	2144	<u> </u>	5.25		1 4		17.0	<u>, </u>		2/02	145				angada Maganitan Panda Saga
92	8	SLAPT AX	-		5.340						,	L scaur	AX.TRA	irs aloi	uG
92	7		•		ą,	J.	·			•	•	CENTER	e of oute	R STREA	M
															· · · · · · · · · · · · · · · · · · ·
											` `				
				<u>, . . </u>	·										
				1											

NOMENCLATURE

P_r = Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

T_T = Total Temperature

 $V_{a/c}$ = Free Jet Velocity

TABLE 5-40

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/16/82

c n	MODEL	TEST PT.	P ^o r	Tr , OR	V ^o , ft/s	P _r i	T _T , OR	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.	
74	1	120	3.32/	1713	2461	3./23	875	1709	2308	1543	400	5.23	0.62	

Graph No.	Histo No.	Type of Travers	Slant e Axial			olts EW	£	NS	Slant Ax. F X'/h	ממל	Axial Posit. X/D _{eq}	Radia Posit F/D _{eq}			Turb. Velocity Ft/Sec	Remarks
		REF	92	1.520	6.8	76	13.	921	PLU	<u> </u>	TIP:					
875		PX								1	•	0.0			1	
876				•	,	,				\int	•	1		0		AX. TRAVES. ON Your =0
877			177	•	7.	348				\mathcal{T}		5		6	•	AND 0.5.
878										7		1		•	•	
	2095			1.520						7	0.0			2297	92	
	2096	1		1560						-	0.54			2133	145	
	297	1		1.600							1.08			2242	173	
	2098	1 1		1.640							1.62			207,3	199	
	2099	1		1.680		45		·			2.17			2027	182	
	2/00			1.720							2.71			1975	166	HISTO, HEASURED AXIALLY
	2/0/			1.760							3.25			1901	150	DN 1/0 = 0.5
	2/02		17	1.800							3.79			1929	161	D
	2/03	4 1		1.840							4.33			1860	149	
	2104	1	17	1.880							4.87		-	1914	167	
	2/05	1 ./	11	1.960		Y		∜			5.95	V	ing territ	1859	188	

NOMENCLATURE

P_r = Pressure Ratio

 $V_{:} = Fully Expanded Jet Velocity$

D = Equivalent Diameter

 $T_T = Total Temperature$

V = Free Jet Velocity



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CT	MODEL	TEST PT	P°	TT	, R	Vj, ft/s	3]	Pr T	, R	V, ft/s	V _j , ft/s	T _T R	$V_{a/c}$, $\frac{ft}{s}$ D_{eq} , in. h , in. OOR
75	_/_	120	3.32	/ /	7/3	2461	_3.	123	875	1709	2308	1543	
Graj No		Type of Traverse	Slant Axial	Positic Axial	on (Vol		S	Slant Ax. Pos X¹/hº	Axial Posit	Posts	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	2106	AX		2.040	7.69	+8 13.9	2/	/	7.04	0.5	1721	224	
<u></u>	2107		/_	2,120					8.12		1694	251	
	2108			2.200					9.20		1635	25-2	HISTO. HEASUKED AXIBUX
	2109			2.28:0					10.28		1550	257	OU 1/0 = 0.5
***************************************	2110	V	20 50000	2.360	<u> </u>			/	11.37			هي	0
879	-	EADIAL.	0530	1.359	,			016 R 1152 011	ALE EXIT		•		
880			Ų.					4		•	•	•	
2-8			1.500					3.58		•	•		
282			V		•			4	1	•	•	•	
883			2.500		,			7.16			•	•	
884	.]		J		•			₽.			•	•	ROMAL TROURS, 1150R
381	•		3.500					10.74			•	•	MOZZLE EXT
886			V					V	17	·		•	
887			4500	1				14.32		•	•	•	
888			V		•			ψ.		·	•	•	
889		V	S.000	7	•	17		16.11	17	·	•	•	

P_r = Pressure Ratio

V = Fully Expanded Jet Velocity

 $T_T = Total Temperature$

■ Free Jet Velocity

h = Annulus Height

D_{eq} = Equivalent Diameter

ਹਾ	MODEL.	TEST PT.	P ^o r	TT , OR	V ^o j, ft/s	P ⁱ r	T _T , O _R	V ⁱ , ft/s	v ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	ĥ, in.
76		120	3.32/	1713	2461	3,123	875	13709	2308	1543	400	5.23	0.62

Graph No.	Histo No.	Type of Traverse	Slant	H.	itio ial	(Volts		NS	Slant Ax. Pos. X'/h°	Po	sit.	Radiai Posit. N/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
890		RADIAL.	5.000			•	13.	.72/	16.11		7	•			
891	WVCP-Weeks.her	بر مراجع المراجع 4.000			•			12.53			•	•	•		
892			J.			٠			Ų			•	•		
893	-		3.000			٠			8.95			•	•	•	
894			4			•			Ţ			•	·	•	PRANAL TRAIRS, NOAR
895			2,000						5.37			•		•	NOZZLE EXT
896			V.		Part Marie Liber	*	-0		J			•	•	•	
897			1.000			•	****	-	1.79				•	•	
898		Y	V	/		•			Į,			•	•	•	
899		SLAJNT AX		•	, ,	5.082			•	•		`			SLAUT BX. TRAVES, BLONG
900		<u>,</u>	-	•		J			•	•		•	•		OUTER USBRUE LIF- LINE
				0-354434											A William Committee of the Committee of
) - 1, , , , , , , , , , , , , , , , , , 								
							١	1			7				

P_r ≈ Pressure Ratio

 V_j = Fully Expanded Jet Velocity

 $D_{eq} = Equivalent Dlameter$

T_T = Total Temperature

V_{a/c} ≈ Free Jet Velocity

	MODEL	TEST PT.	P ^o r	Tr , OR	V ^o , ft/s	P ⁱ r	T _T , o _R	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.	. 1
57	1	120	3.32/	1713	2461	3.123	875	1709	2308	1543	400	5.23	0.62	

Graph No.	Histo No.	Type of Traverse	Slant		n (Volts EW) NS	Slant Ax. Pos. X'/h°	Axial Posit. X/D _{eq}	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF	0.499	1.505	5.477	13.420	OUTER NO	ZZE E)	ν <i>Τ</i>			
932		SLANT	-						,	,	,	SLANT BY TRAVES. BLONG
933			•					·	•			DOTER MEELE LIP-LINE
	2/45		0.594				0.69			2066	79	
	2146		0.965				1.66			2238	195	
	2147		1.228				2.61		•	2539	160	
	2148		1.445				3.38		•	2462	98	
	2149		1.698				4.29		,	2377	62	
	2150		1.748				5.18	•	•	2506	78	
	2151		2/78			<u> </u>	6.08	•		2237	266	HISTO. MEASURED AXIALLY
	2152		2452				6.99	•	•	2097	233	ALONG OUTER MISSLE
	21.53	[2.695				7.86	٠	,	2146	195	LIP-LINE
	2/54	1	2.948				8.76	•	•	2084	210	
	3122		3.448				10.55	•		2155	157	
	2156	1	3, 1.98				9.66	•	•	2/30	177	
	2157	1	3.698		V	V	11.45	,		2214	106	

P_r ≈ Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

 $V_{a/c}$ = Free Jet Velocity

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578	MODEL	TEST PT.	P ^o r	T _T , O _R	V ^o , ft/s	P ⁱ r	Tr, oR	V ⁱ , ft/s	V ^{mix} ft/s	T _T O _R	$V_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.
	/	120	3.32/	1713	2461	3/23	875	1709	2308	1543	400	<u>5.23</u>	0.62

Graph No.	Histo No.	of Traverse	Slant Axial	Positio Axial	n (Volts EW) NS	Slant Ax. Pos. X'/h"	Posit	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	2158	SLANT	4.178		5.477	13.420	13.24	,	1	2267	93	
*	2159		4.678				15.03	,	•	2243		HISTO. MEASURED AXALLY
	2160		2118		<u> </u>		16.54		•	2197		ALONG OUTER NATHE LIP-LINE
901					5.488		-					SLAUT AY, TRAKS, ALONG
962					A .	Ψ.				•	•	CENTERLINE . F OUTER STREAM
						i						
						· ·						
												
		<u> </u>										
				· ·······								
			A section of the section									

NOMENCLATURE

P_r = Pressure Ratio

V; = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T ≈ Total Temperature

Free Jet Velocity



TABLE 5-45

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/7/82

CT	MODEL	TEST PT.	P° r	TT , OR	V ^o , ft/s	P _r i	T _T , o _R	v _j , ft/s	V ^{mix} ft/s	TT OR	V _{a/c} , ft	D _{eq} , in.	h, in.
79	1	1119	3.434	861	1754	3.144	228	1694	1744	860	0	5.23	0.62

Grapi	Histo	T	ург		Select a par	Position	- (1	alte	1		Slan		Avial	Radial	Mean	Turb.	
No.	No.	ĺ	of Iverse	Slan Axia	it]	Axial		EW	•	NS		Pos	Posit.	Posit.	Velocity	Velocity	Remarks
		RE	E		2	1.457	7.	/22	13	.708	PLU	G	TOP				,
								<u> </u>					<u> </u>				4
801			λ Χ	-	4			<u> </u>				\perp		0.0	_	•	AX. TRAVES ON JET AXIS
825]		4	**	•	<u>/</u>	<u> </u>			\perp	-	0.0		•	
803		~~~		·	Ц		7.	711						0.5	•	B	AX. TRAVES ON TO = 0.5
82 <u>é</u>	 					-					<u> </u>		-	0.5	•	7	
	2000		RE 7º			1.346					plug 7	IP_	1.49		1644	% -2	
	200/					1.476							2.03		1521	134	
	200.2					1537							2.58		1615	111	
	2003				_ _	1579							3.45		1472	18-1	
	2004					1618							3.68		1566	153	HIGTO HEASONED BUALLY
	2005					1.618							3.68		1575	135	ON 70 = 0.5
	2006			1		1658							4.22		1534	144	
	2007					1.696							4.74		1528	122	
	2008					1.738					/ ·		5.30		1502	/38	
	2009	4		in had not been a fine		1277	V	/	A				5.83	V	1461	142	

NOMENCLATURE

P = Pressure Ratio

V_i = Fully Expanded Jet Velocity

 $D_{eq} = Equivalent Diameter$

T_T = Total Temperature

 $V_{a/c}$ = Free Jet Velocity

	MODEL	TEST PT.	P°	TT , OR	V ^o , ft/s	P ⁱ r	T _T , o _R	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	Va/c, ft	D _{eq} , in.	h, in.
580	/	1119	3.434	86 /	1754	3.144	822	1694	1744	860	0	<i>ફ</i> .23	0.62

Graph No.	Histo No.	Type of Traverse	Slant		(Volts)) NS	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. 权D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity F%/Sec	Remarks
	20/0	AX		1.818	7.9//	13.708		6.39	0.5	1455	,43	
	2011			1.857]			6.21		1429	133	
	2012			1.895				7.43		1391	147	
	2013			1.938				8.01		1399	158	
	2014			1.981				8.59		1337	158	
	2015			2.022				9.15		1317	198	HISTO, MEASURED PERALLY
	2016			2,022				9.15		1321	166	ON 1/009 = 0.5.
	2017			2.055				9.59		1307	178	8
	2018			2,098				10.18		1262	197	
	2019			2.138				10.72		1236	204	
	2020			2175				11.22		1228	209	
	202/			2.218				11.80		1191	214	
	2025			2,261			1	12.38		1176	220	
	2023			2.500			/	15.62	- ₩	1025	211)
				-								
			1									

P_r * Pressure Ratio

 $V_i = V_i$ Fully Expanded Jet Velocity

D = Equivalent Diameter

 $T_T = Total Temperature$

Va/c = Free Jet Velocity

TABLE 5-47

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER TEST DATE 9/7/82

Tr o R Vo, ft/s V_{i}^{i} , ft/s V_{i}^{mix} ft/s T_{T}^{mix} oR h, in. V_{a/c}, ft D_{eq}, in. MODEL TEST PT. CT $\bar{\alpha}$ 1694 3.434 1754 3,144 855 1744 860 5.23 0.62 1119 861 0

Graph	Histo	Туре		Position	n (Volts))	Slant		Radial		Turb.	net stakker knijemele ser og skild blekker gemen ogspårk sky foreg som de fleren er en en et system symmelisen blekker skyl 1982 i 19 3 stak
No.	₩о.	of Traverse	Slant Axial	Axial	EM	NS	Ax. Pos.	Posit. X/D eq	Posit. R/D eq	Velocity Ft/Sec	Velocity Ft/Sec	Remarks
		Ref	0.950		-	13.708	OUTER NO	ZZLE E	KIT			
805		RADIAL	1.000		-		0.18		•	•	1	
806			1.000						•		•	
367			1.560		_		1.97		•		•	
808			1.500		-		₩.			•	•	
809			2,000		-		3.76		-	•	•	
810			2.000		-		Ŷ		_	•	•	
811			2.500		-		5.55		•			
812			2.500		,		Ψ		-	•	•	PADLAL TRAVERS. NEGR
813			3.000		_		7.34		-	•	•	EXIT
814			3.000				Ų		-	•		
815			3,500		-		9-13		-	•		-
816			3.500		ŧ		Ų		-	•		
817			ಟ್ಟ. ಕರಾ		-		10.92		-		•	
818			1.000		-		J			·	•	
819		V	4,500		-	V	12.71		-			

NOMENCLATURE

P_r ™ Pressure Ratio

V. = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V_{a/c} = Free Jet Velocity

h = Annulus Height

- . .

and the second of the second

TEST DATE 9/7/82

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Í	MODEL	TEST PT.	P° r	Tr , oR	v ^o , ft/s	P ⁱ r	TT, OR	V ⁱ , ft/s	v ^{mix} ft/s	TT, OR	V _{a/c} , ft	D in.	h, in.	4
28	1	1119	3,434	861	1754	3.144	228	1694	1744	860	0	5.23	0.62	

Graph No.	Histo No.	Type of Traverse	Slant	Position Axial	(Volts) EW	NS	Slant Ax. Pos. X'/h°	Axial Posit. X/D _{eq}	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
820		RADIAL	4,500	/_	•	13.708	12.71					
821			5.000		•		14.50			<u> </u>	•	
822			5.00	/	-		4					RADIAL TRAIRS, NEAR EXIT
823			8.200	7	•		16.29				•	
824		V	5250		•	V	Ţ		•	<u> </u>	•	<u>J</u>
•		·,					•		•	•	•	
827		SLANT AX		,	5.467	13.708	•		,			SLANT BY TRAVES, ALDING
828		J		4	5.85/	J	•	1/	·	•	•	THUER HORZLE LIP-LINE
g a o		X.,	AND THE PERSON NAMED IN	e de la companya de l		« القدر في يومك اطلاب وهدي .»	de transcription de <u>de</u> transcriptions					AND CENTERLINE . F OUT ER
												STRAM , RESPECTIVELY
				التقائر بيدين وي الأفادي							<u> </u>	
	<u> </u>											

NOMENCLATURE

P_r

■ Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Dlameter

 $T_T = Total Temperature$

 $v_{-/2}$ = Free Jet Velocity

TEST DATE 9/8/82

	MODEL	TEST PT.	P _r	T _T , o _R	v ^o , ft/s	P _r i	T, OR	v ⁱ , ft/s	V ^{mix} ft/s	T _T ^{mix} , o _R	V _{a/c} , ft	D _{eq} , in.	h, in.	
್ ೮೨	,	,,,9	2434	861	1754	3.144	855	1694	1764	860	0	5.23	0.62	

Graph No.	Histo No.	Type of Traverse	Slant	Positio Axial		olts) EW		NS	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF_	1_000	1.277	5.8	<u>'51</u>	/3.	254	OUTER NO	ESCE EX	7	,	•	
829		SLANT	5				<u> </u>						•	SLANT AX. TRAVES. ALONG
830			•						•					OUTER NOTTLE LIP-LINE
	2024		6.000						17.9			1542	60	
	2025		5.500						16.1			1541	82	
	2026		5.000						V			1624	63	
	2027		4500			} 			12.5			1678	52	
	2028		4000		1		4.48 <u>000</u>		10.7			1692	49	
	<u> </u>		3,000		 	-			8.95			1650	33	HISTO, HEASURED ANGUY
	2029		3,300		-			 ·	7.16			128.2	52.	ALOUG CUTER NOBELE
	2030		The second division in which the second	 /	1		ļ		0.90			1493	78	LIP-LINE.
	203/		1.250	 	╫				179	1		1729	144	
	2032		1.500	 	 	-	-		2.69	1-/	1/	1929	91	
<u> </u>	2033		1.750	7	- 	-	-		3.58	 - 	+	1750	166	
	2034	1	2.000			-	+-	-	4:03	1/	1/	1228	97	And Anthonous Advantage (Anthonous Anthonous A
	2035	 	5752 5152		-{]	 	 	4.4.8	 	 	165-8	66	

HOMENCLATURE

Pr = Pressure Ratio

 $V_j = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

T_T = Total Temperature

Va/c = Free Jet Velocity

h = Annulus Height

Come.

9/8/82 TEST DATE

J	MODEL	TEST PT.	P ^o r	TTO , OR	V ^o , ft/s	P ¹ r	T _T , OR	V ⁱ , ft/s	V ^{mix} ft/s	TT, R	V _{a/c} , ft	D _{eq} , in.	h, in.	OR QU
)84 4	/	1119	3,434	86/	1754	3,144	855	1694	1744	860	0	5.23	0.62	ALTA BE 180

No.	Histo No.	Type of Traverse	Slant	A 1 - 1	on (Volts EW	NS	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. R/D eq	Hean Velocity Ft/Sec		Remarks
	2037	SLANT	2.500		5-851	13.254	s.37			1814	98	
	2038		2.750				6.27			1536	224	
	2037		2750				7			1540	15-6	
	2040		3,250				8.06			1620	183	HISTO. HEADIRED DYIBUY
	206/		3.750				9.84			1671	42	ALONG OUTER NOTTE
	2042		4.250				11.6			1672		LIP-UNE
	<u>که(د)</u>		4.750				13.4			1649	58	
	2064		5.250				15.2			1228	8.9	
	2045	V	5.750				17.0	<u> </u>	<u> </u>	1516	70	
			برن داد داد داد داد داد داد داد داد داد دا						, , , , , , , , , , , , , , , , , , ,			
			-	فدان في المراجع و المراجع				<u> </u>				
						<u> </u>	ļ		<u> </u>			
		-				<u> </u>	ļ					
						Ą	A			ł]	

NOMENCLATURE

Pr = Pressure Ratio

Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_{\overline{1}} = Total Temperature$

■ Free Jet Velocity

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MODEL	TEST PT.	P ^o r	T _T , o _R	V ^o , ft/s	P ¹ r	T _T , OR	V ⁱ , ft/s	V ^{mix} ft/s	T _T , R	$V_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in
/	1/20	3.4oz	884	1772	3.140	858	1696	1759	860	400	S. 2J	0.62

Graph Ko.	Histo No.		Slant Axial	Position Axial	(Volts) NS	Slant Ax. Pos. X'/h°	Axial Posit. X/D eq	Radial Posit. R/D eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF	- 1	1.479	7.053	13.670	PLUG TI	þ			and the second s	
836		AX						•	0.0	•	•	
837					₩				ĵ	•	•	AX. TEAURS, ON YOU O AND O.S.
83 %				•	7.870			•	0.5	•	•	0
8:39				4				•		٠	•	
	2046			1.483				0.05		1655	60	
	2047			1.522				0.58		1548	142	
	2068			1.525			/	820		1549	198	
	2049			1.522				058		1002	102	
	2050			1.564		·		1.15		1656	91	
	2051			1.599				1.62		1036	149	HISTO. MEASURED AXIALLY
	2052			1.642				2.2/		1609		ou %==0.5.
	20 <u>C</u> 3			1.684				2.77		1574	121	
	2054			1.720			/	3.26		1518	105	
	3000			1-764				3.88		522\	116	
	2056	V		1.799	¥	J.		4.33	4	1444	108	

NOMENCLATURE

P_r = Pressure Ratio

= Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T ™ Total Temperature

a/c Free Jet Velocity

C 17	MODEL	TEST PT.	P° r	TTOR	V ^o , ft/s	Pr	T _T , o _R	V _j , ft/s	V ^{mix} ft/s	TT, R	V _{a/c} , ft	D _{eq} , in.	h, in.	אל פעו
986	1	1120	3402	884	1772	3.140	858	1696	1759	880	400	<i>5</i> 7.23	0.62	ALITY.

Graph No.	Histo No.	Type of Traverse	Slant	Position Axial	(Volts) NS	Slant Ax. Pos. X ¹ /h°	Posit.	Radial Posit. A/D eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	2057	AX		1.842	7.870	13.670		4.91	0.5	/502	120	
	2058			1.885	Į .			5.49	<u> </u>	1396	124	
	2059			1.922	A-0-0-0-0			5.99		1476	/33	·
	2.060			1.959		<u> </u>		649		1374	139	
	2061			2.002				7.08		1411	148	
	2062			2.0\$2				7.62		1356	148	
	2063			2.082				8.16		1343	164	HISTO. MEASURED ASIALLY
-0.40 (2064			2.124				8.73		1324		ON 1/D==0.5.
The second second	2065			2.162				9.24		1290	177	Į .
	2066			2.204		·		9.81		1227	200	
-7-10-6-11-1-1	2067			· ·				9.81		1245	2/2	
	2068	74.74		2.204				9.81		1265	182	
	2069			2.243				10.34		1525	189	
	2070			¥				10.34		1254	197	
	2071			2.28/				10.85		1228	192	
	2072	Y		2499	Y .	Y	1	13.80	Y	1108	196	J

P_r = Pressure Ratio

V = Fully Expanded Jet Velocity

 D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V ≈ Free Jet Velocity

TEST DATE 9/10/82

C 17	MODEL	TEST PT.	P°	Tr , OR	V ^o , ft/s	P _r i	TT, OR	v _j , ft/s	V _j , ft/s	T _T ^{mix} O _R	V _{a/c} , ft	D _{eq} , in.	h, in.
87		1120	3.402	884	1772	3.140	858	1696	1759	880	400	5.23	0.62

Graph No.	Histo No.	Type of Traverse	Slant	Position Axial	(Volts) NS	Slant Ax. P X'/h°	os Posit	Radial Posit. KVD eq	Valocity	Turb. Velocity Ft/Sec	Remarks
		REF	0.950	-	-	13.7	OUTER	WARKE E	K/ 7			
840	***************************************	RODIAL	1.000				0.18			•	•	
841			1.000			-	J		•	•	•	
842			1.500		-		1.97		•		•	
863			6500		•		.		•	•	•	Andrew State Control of the Control
366			≥,008		•		3.76		•	•	•	- Angelen der State Stat
256			2.000		•		J.		•		•	
846			2.500		•		5.53		•	•	•	RAGIAL TRAIRS, LIEAR
847			2.500				Ų		•			NOTACE EXT
848			3.060		•		7.34		•	,	*	
849			3,000		•		Y		•	•	•	
820			3,500				9.13		•			
128			3200		•		J.			•		
852			4000		•		10.93	2 /		•	•	
853			4.000		•		Į.		•	•	•	
						V						

NOMENCLATURE

P = Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

 $D_{eq} = Equivalent Diameter$

 $T_T = Total Temperature$

V Free Jet Velocity

	MODEL	TEST PT.	p° r	Tro,	°R V°,	ft/s	P _r i	T _T , o _R	V ⁱ , ft/s	V ^{mix} ft/s	TT , R	V _{a/c} , ft	D _{eq} , in.	h, in.	PAGE IS
		1/20	3.402	88	4 17	72	3.140	828	1696	1759	880	400	ડ.2 3	0.62	25
	h Histo No.	of i	Slant		(Volts	NS		ne Posit	Posit	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec		Remarks		
		REF SLANT AX	•	٠	8.958 8.958	13.80	PLUG :	710			·	1			
7 7 7 7			Report	îted o	N &−81	7~8	70								
<u> </u>				*	5.283 V	13.80		-:		`		41			
															· · · · · · · · · · · · · · · · · · ·
	1 - 4 - 5 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7	raph Histo No. No.	raph Histo Type of Traverse REF SLANT	raph Histo Type No. No. of Slant Traverse Axial REF SLANT AX REF 7 REF 9	/ //20 3.402 88 raph Histo Type Position No. No. of Slant Axial Traverse Axial Axial REF- SCANT AX REF- SCANT AX REF- SCANT AX REF- SCANT AX REF- STED A R		1	1	1	1	1	1	1	1	1

P_r = Pressure Ratio

 v_i = Fully Expanded Jet Velocity

D_{eq} = Equivalent Dlameter

T_T ™ Total Temperature

V = Free Jet Velocity

h = Annulus Height

<u>~</u>

T.

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/16/82

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	MODEL	TEST PT.	P ^o r	Tr , R	v ^o , ft/s	P _r i	T _T , O _R	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	$V_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.
589		1120	3.402	884	1772	3.140	858	1696	1759	880	400	J.23	0.62

Graph No.	Histo No.	Type of	Slant	Positio	ś	s)		Slant Ax. Pos. X'7h°	Axial Posit.	Radial	Mean Velocity	Turb. Velocity	Remarks
		Traverso		Axial	EW		NS	X'7h"	¥∕D _{eq}	₩ _{eq}	Ft/Sec	Ft/Sec	numai ka
			0503	1.304	5378	13.	473	OUTER NO	89CE E	×7			
869		SLANT	•		5.198			•	•	• [•	SLANT PR. TRAVES. ALONG
870									• /	• /	•	•	OUTER NORRIE HP- UNE
	<u> 207)</u>		0.750			1		0.88			2221	59	
	2074		1.000					1.78			1834	8/	
	2075		1.250					2.67			1986	93	
	2076		1.580					3.56			1777	94	
	2077		1.750					4.46			1649	45	
	2078		2.000					\$.36			1873	77	LUISTO, MEASULED AXIBUY OU
	2079		2.189				·	6.04			1883		COTER NO BELLE LIFE LINE
	2080		2.281					6.36			1400	150	
	2081		2.500					7.15			1238	60	·
	2082		2,750					8.04			1653	43	
	2083		3.000					8.94			1641	3/	
	2084	,	3.220	1				9.83			1667	32	
	7082	∜	3,500	1	V		V	10.73			1674	33	

NOMENCLATURE

P_r ∞ Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

T_T = Total Temperature

V_{a/c} = Free Jet Velocity

TABLE 5-56

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/16/82

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	MOD	EL	TEST PT	P _r		T _T	, OR	ν <mark>o</mark> ,	ft/s	P ⁱ r	T _T ,	°R	v _j , ft/s	v ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.	DRIGINAL OF POOR
590		,	1120	34		í			1	3.140		28	-	1759		400	5.23	·	AL PAG
Gr	aph H O. 1	sto lo.	Type of Traverse	Slant Axial		itio :ial	n (Vo	olts W) NS	Slant Ax. P X'/hº	ns I	Axial Posit X/D _{eq}	Radial Posit.	Valority	Turb. Velocity Ft/Sec		Remarks		AUNTON SI HOWA
		86	SCAUT	3.750			S.3	98	13.47	11.6	2			1675	35		ering and a second second second		al section of the result.
		87		4,000						(2.5)	2			1685	39			***	
		28		4,250		-		-		(3.4				1656	કડ				
		89		4.500		┼—		·		14.3			 /-	1621	62				
		90		6.750 8.060						15.2		-/	 -/	1587	76		. MEASU		-
		92		5.250	7					16.1		/	 	155/	84	े विश्व	TEL NOW	ste fib-	UNE
		93		5.500	1	Piga-gallicita ipriya-				17.8		 	1/	1558	78 81				
		984	V	s.75°0	7		¥		V	18.7		· · · · · · · · · · · · · · · · · · ·	1/	1538	7.5				
							10-00-0]			_								
		_			-71.4														

NOMENCLATURE

Pr Pressure Ratio

 V_i = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

V_{a/c} ■ Free Jet Velocity

	MODEL	TEST PT.	P ^o r	T _T , o _R	v ^o , ft/s	P ⁱ r	TT, OR	v ⁱ , ft/s	V ^{mix} ft/s	TT , OR	V _{a/c} , ft	D _{eq} , in.	h, in.
59	1	101	1	-	_	3.140	859	1696	-	_	0	<i>5.</i> 23	0.62

Graph No.	Histo No.	Type of Traverse	Slant	Position Axial	(Volts	NS	Slant Ax. Pos. X1/h°	Axial Posit. X/D	Radial Posit. K/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
831		SCRINT AX		•	5.261	13.254	•	1			,	SLAUT AX TRAUKS. ALDUG
832			•	•	Ą		•		•	•	•	CENTERLINE OF IMPROTREAM
გეპ		1	•	,	5.420			·		·	•	SCANT AX. TRAVES, ALONG IMUBE
834		AY	•	•	7.040		•		0:0	·	,	
805		4	•	•	*	Į,	•		J	•	•	AX. TRAURS. ON POSE = 0
												· ·
			-bioronin @aş			4 - Can 2 12 - In mark						
										·		
	<u> </u>											
							· · · · · · · · · · · · · · · · · · ·					

Pr = Pressure Ratio

 $V_i = Fvily Expanded Jet Velocity$

D = Equivalent Diameter

 $T_T = Total Temperature$

V = Free Jet Velocity

£ 5	MODE	[,	TEST PT.	Por		T _T ,	OR	v ^o j,	ft/s	3	P _r i	TT	, OR	v <mark>i</mark> , f	t/s	V ^{mix} ft/s	T _T , R	$V_{a/c}, \frac{f}{s}$	t D _{e4} , in	h, in.	GINAL
592	2		219	3.3	ા	168	1	24	36	ز	3.130	8	759	169	بح	2287	1494	0	5.29	0.77	PAGE IS
-	ph His). I	Type of Traverse	'Slant Axial		ition ial		lts) W	N	S	Slan Ax. X'/h	Pas.	Axial Posit 以D _{eq}	. Pos	ial it.	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec		Remark	S	76
			REF -	-	1.5	22			13.9	<i>ده</i>	PLV	G 7	rp_								
97		_	<u> </u>				<u>የ የ.</u>			, -		-		<u>0.</u>		•	•	AX.TI	eaurs, on	7/000 =0 A	uo
97							7.6	75				\int	•	0.	<u>s-</u>		•		RESPECTIVE	"	
978	}	_					_					_		_				<u> </u>			<u> </u>
	2.20	}			1.5							 	0.00			2287	165- 281			<u>,</u>	
	220				1.6								1.06			2047	268				د د د د کاربرد و درستان
	220					39							1.5-7			1961	318				
	220	4			1.6	82				-	<u> </u>	-	2.14			1861	3/3	6	R. HISTO. F		
	22.0			 -		22	_			alataris (militaris). V	-/-	<u> </u>	2.68	-		1975	332	AXA	ILL ON	10 m = 0.5.	
	220				1	60				Company of the last	H-		3.18 3.77			1958	336 333				
-	220 220				1	40					\Box	<u> </u>	4.25			1909	332	-			
	220				1	79							4.78			1919	326				
	72.1		V			64	V		Y		1		5.91		/	1836	287				

P_r = Pressure Ratio

V = Fully Expanded Jet Velocity

D = Equivalent Diameter

T_T = Total Temperature

 $V_{a/c}$ = Free Jet Velocity

MODEL	TEST PT.	P _r	Tr , OR	V ^o , ft/s	P _r i	T _T , O _R	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
2	219	3.313	1681	2436	3.130	859	1695	2297	1494	0	5.29	0.77

Graph No.	Histo No.	of Traverse		*xlai	n (Volts)	NS	Slant Ax. Pos X'/h°	Posit.	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	22//	AX	7	f	7.675	13.905		6.96	0.5	1671	323	
	2212]	7	2.12/	1			8.01		1505	295	TURB. HISTO. MEASURED
	22/3		7	2.201				9.08		1424	309	OWALLY ON The = 0.5.
	2214.		7	2, 283						-		U
	22/5	V	/	2,283	\downarrow			10.18	V	1372	رەد	<u> </u>
-		REF	0.500	1-1405	-		OUTER N	DBRIE E	×17 ·			
979		RADIAL	0.530				0.09		•	<u> </u>	•	
980			J.		,		Ψ		<u> </u>			
981			0.896		•		1.14				•	
982			J				J.			<u> </u>	•	RANAL TROVES NEAR
983			1.292		•		2.28		*		*	NOZZLE EXIT
984			J		•		J J				•	
285			1.688		•		3.43	<u> </u>		•	•	
986			J.		,		ν	<u> </u>		<u> </u>	•	
987			2.084	/	•		4.57	 	· .		•	
288		I V	Ţ	1		<u>V</u>	 	1/				

P_r = Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

V_{a/c} = Free Jet Velocity

TEST DATE 9/23/82

ದ	MODEL	TEST PT.	P ^o r	T _T , O _R	V ^o j, ft/s	P _r i	T _T , o _R	V ⁱ , ft/s	V ^{mix} ft/s	T _T OR	V _{a/c} , ft	D _{eq} , in.	h°, in.
94	2	219	3.313	1681	2436	3.130	859	1695	2297	1494	0	5.29	0.77

Grapi No.	Histo No.	Type of Travers	Slant Axial	Avial	n (Volts EW) NS	Slant Ax. Pos X'/hº	Axial Posit. X/D	Radial Posit. KVD eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
989	ļ	PANAL	2.480			13.905	5.71		•		• Anna anna anna anna anna anna anna ann	
990	<u></u>] }		•		j	/	•			
991			2.876	/_			6.85	/	•		•	
992	ļ		<u> </u>		<u> </u>		J.		•		•	RADIAL TRAVES NEAR
993			3.272				7.992		•	•	•	MORRIE ENT
994			1		,		V	7	,	•	•	
995			3.668				9.134		•	•		
996				/	•		J			•	•	
997			4.064		•		10.28	7	•			
98			1		•		J	1		•		
			0.700		5.48		OUTER MOE	QUE EX	-	,		
059		SLANT AX		/					,			
060				/						•		
1063			<u> </u>						•	,		SUANT AX. TRAVES ALONG
064			·					·	•	•	1	THER AND OUTER MOTTLE
	2521	V	4300		A	V	10.38	-		23 62	61	LAP-LINES, RESPECTIVELY.

NOMENCLATURE

P_r * Pressure Ratio

 V_i = Fully Expanded Jet Velocity

D = Equivalent Diameter

T_T ™ Total Temperature

 $V_{a/c}$ = Free Jet Velocity

TEST DATE 9/23/82

h, in. V_{j}^{i} , ft/s V_{j}^{mix} ft/s Tr , OR Vo, ft/s $V_{a/c}, \frac{ft}{s}D_{eq}, in.$ TEST PT. MODEL 1494 2297 5.29 24.36 859 1695 3.130 3.313 1681 219

595	2	219	3.31	3 16	8/ 2	4.36	3.	130 8	359	1695	2297	1494	0_	5.29	0.77	K M
Gra No	ph Histo No.	Type of Traverse	Slant	Positio Axiai	n (Volts	s) NS	S	Slant Ax. Pos X'/h'	Axial Posit. X/D _{eq}	Radial Posit. R/D _{eq}	Hean Velocity Ft/Sec	Turb. Velocity Ft/Sec		Remark		
	2252	SLANT AX	4.100		5.418	13.90	-	9.80		4/	2377	8-5				
	225 <u>}</u>		3.696 3.288			-		8.64 7.46	 /	/	2410	72			· · · · · · · · · · · · · · · · · · ·	<u></u>
	2255		2.89/					6.32			2376	7 4				
	221.8		2.496					5.18 4.03	<i> -</i>	 	2360	73 89	11	. HISTO, HE HLY OU O		
	2257		2.099 1.704	/				2.89			2370	95	11	LINE.	JIEG WEE	
	2259		1.30/	7				/·73	-/	 	2340	161				<u></u>
	2260	¥	0.901 1.103	<u> </u>	 	+	\exists	0.58	/	1/	2330	112				
106		SCANT AX	1300			13.2	20	•					11	T AX. TIPAY		
106	2-	J				<u> </u>							CENT	FRI INE OF	·TOUTER .	STREGH
		<u> </u>			 	-	_	·					1		,	

NOMENCLATURE

P_r = Pressure Ratio

V. = Fully Expanded Jet Velocity

≖ Equivalent Diameter

 $T_{r} = Total Temperature$

■ Free Jet Velocity



TABLE 5-62

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/23/82

55	MODEL	TEST PT.	P ^o r	T _T , O _R	v ^o , ft/s	P _r i	T _T , o _R	vi, ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
6	2	220	3.318	1700	2451	3.129	852	1688	2308	1506	450	5.29	0.77

	Histo				(Volts)	Slant	Axial	Radiai	Hean	Turb.	
No.	No.	of Traverse	Slant Axial	Axial	. EW	NS	Ax. Pos. X'/h°	Y/D _{eq}	R/D _{eq}	Velocity Ft/Sec	Velocity Ft/Sec	Remarks
		PEF		1.522	6.846	13.839	PLUG T	ρ				
999		_AX		*	6.846			•	0.0	•	•	
1000								•	Ţ	•	•	AX TRAIRS. ON YOU = O AND
1001					7.646				0.5	•	•	AX TRAIRS. ON YOU = O AND O.S. RESPECTIVELY.
1002								<u> </u>		•	•	
**************************************	2216			7.835				0.00		1651	83	
	2217			1564				0.56		1482	160	
	2218			1.608				1.15		1533	147	
	2219			1.646				1.66		1486	174	
	<u> 2220</u>			1.690		·		2.25		1490	173	
	2221			1.724				2.68		1498	180	TURB. HISTO. MEASURED
	2222			1.763				3.22		1462	180	AXIALLY ON They=0.5.
	2223		1	1.8.07				3.81		1498	178	
	2224		J	1.864			<u> </u>	4.3 /	<u> </u>	1473	180	
	222S		<u> </u>	1.886				4.87		1471	181	
	2226	N		1.966	¥		Į.	5.94		1418	180	

NOMENCLATURE

 $P_r = Pressure Ratio$ $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

■ Free Jet Velocity

TABLE	5-	6	3
TUDLE	_	-	_

 T_{T}^{o} , ${}^{o}R \mid V_{j}^{o}$, $ft/s \mid$

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER TEST DATE 9/23/82

 V_j^i , ft/s V_j^{mix} ft/s T_T^{mix} or $V_{a/c}$, $\frac{ft}{s}$ D_{eq} , in. h_s^o in.

97	2	220	3.3/	8 17	00 2	451	3.129	852	188	2308	1506	400 5.29 0.77
Gra No	ph Histo . No.	Type of Traverse	Slant Axial		n (Volts EW) NS	Slant Ax. P X'/h°	os. Pos	t. Posit	8	Turb. Velocity Ft/Sec	Remarks
	2227	AX	: /	2,062	7.646	13.83	9	1 6.9	6 0.5	1353	200	
	2228			2127				8.0	7	1273	553	TURB. HISTO, MEASINEED
	<u> 222 9</u>			2.206				9.1.		1197	219	ANALLY ON TOG = 0.5.
	2230	پُ		2.286	<u> </u>	₩.		10.2	2	1196	226]}
************		REF	0.500	1.401	,c,,,,	13.83		4053C	E JJP:			
100	2	PANA!		/			0.09	<u> </u>	<u> </u>		•	
1000	·		<u> </u>						/	•		
100			0.896				1.1.4		<u> </u>		•	
100	ł						<u>ν</u>			·	•	The state of the s
100			1.292	/_			2.28	/			•	RANAL TRAVES. NEAR EXIT
100					***************************************		<u> </u>					
100			1.886				4.00		- 	<u> </u>	•	
1010	·		2.084		•		4			 	•	
101			2.08 1	 -/			4.57			1	•	
101			2480	1	,	V	5.71			•	•	

NOMENCLATURE

MODEL

 σ

TEST PT.

P_r = Pressure Ratio

V = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V = Fr

■ Free Jet Velocity

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/28/82

												<u> </u>				2	2 o
59	MODEL	TEST PT	. Po		Tro,	OR V	j, f	t/s	Pr T,	i o _R	v _j , ft/s	V ^{mix} ft/s	T _T , o _R	V _{a/c} , ft	D _{eq} , in.	h, in.	ORIGINAL
8	2	220	3, 31	- 1	/7		45	1		852		1	1506	<u> </u>	5.29		PAGE
Gra No	ph Histo No.	Type of Traverse	Slant Axial	Posi Ax1		n (Volt EW	s)	NS	Slant Ax. Pos X'/h"	Axial Posit X/D _{eq}	Posit	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	t t	Remarks		
1014	4	RODAL	2.480				/3	839	5.71		<i>A</i> ·		1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		elin de la companya de la companya de la companya de la companya de la companya de la companya de la companya		olenny proside
1015	-		2.876		\perp				6.85				•				
1016			<u> </u>			*		<u> </u>	b		,				والمرابع المرابع		
1017			3.234			•			8.00		•				1 - T	ودران کار و است که با این دران دران این این دران این دران دران دران دران دران دران دران درا	
1018				/			<u> </u>	<u> </u>	J		•		,	RACIA	L TRAINES.	NEAR EXIT	
1019			3.866			•			9.70		·				**************************************		
107.0	<u> </u>					•			J		•	•					-
102/	<u>' </u>		4.054			•		<u> </u>	10.28	<u> </u>		•					
1622			<u>J.</u>			-	ļ	1	J	/			•	IJ	Periodici de la Company de Company de Company de Company de Company de Company de Company de Company de Company		-
1065	ŧ.	SLANT		ي وبخطيج	$\bot \! \! \bot \! \! \! \downarrow$	5.029	13	.839		/	,		•				
1066				- 1700-,	/-	<u> </u>				/		•	٩	SLANTI	9X. TRAVIES	DN INTER	entijina
1059				/	/	<u>5.424</u>	-				•	•		11		NES, REPECTIVE	ELY
	2262		0.987	<u> </u>					1-40	-/-	•	2054	218	 			-
	2263		1.300	\int					2.3/		•	2220	175	HICTO	MERISUREL	SIALT	
emir ones	2264	NONENC	1.700	/		4	,		3.46			2351	110	8		NGZCE UP-UA	走

NOMENCLATURE

 $P_r = Pressure Ratio V_i =$

 V_j = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T ≖ Total Temperature

V_{a/c} = Free Jet Velocity

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i	MODEL	TEST PT.	P _r o	To, oR	v ^o , ft/s		T _T , o _R	V ⁱ , ft/s	ν <mark>mi</mark> πft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
	2	220	3.318	1700	2451	3.129	852	1688	2308	1506	400	5.29	0.77

Graph No.	Histo No.	Typa of Traverse	Slant	Positio Axial	n (Volts) EW	NS	Slant Ax. Pos. X'/h*	Axial Posit. X/D _{eq}	Radial Posit. KVD eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	2265	SLOUT	2.100		8.310	13.839	4.61		•	2366	97	
	2266		2,50/				5.77		,	2377	71	
	2267		2,910	7			6.25	/	,	2404	55	
	2268		3,300	7			8.07	/		2415	5-6	
	2269		3.700	-/-			9.23			2414	<i>ऽ</i> 3	HISTO, MEASURED SLANT
-	2270		4,100				10.38	/		2363	\$7	ANALLY ON OUTER NEZZLE
	227/		4.298	/			10.95	7	6	23/8	74	LIP-LINE
	2272		1496	1		J	2.89	/		2341	110	
1067	22160	SLANT	-	-	5.310	13.839	•	<u> </u>				SLANT AK TRANCS. ALONG
068				•	J	J				•		CENTERLINE OF OUTER STREAM
	<u> </u>											

NOMENCLATURE

P_r = Pressure Ratio

 V_{j} = Fully Expanded Jet Velocity

D = Equivalent Diameter

 $T_{T} = Total Temperature$

V_{a/c} = Free Jet Velocity

60
0
-

								 					,,,, T(
MODEL	TEST PT.	${ t P}^{f o}_{f r}$	Tr , OR	V ^o , ft/s	P ⁱ r	T _T , OR	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	$V_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.	P00
2	1219	3.403	846	1733	3.131	842	1678	1744	845	0	5.29	0.77	ام ا

	Histo			Position	n (Vo	its)		Slant		Axial	Radia	19	Mean	Turb.	
No.	No.	of Traverse	Slant Axial		E	W	1	NS	X'/h°)5.	Posit. X/D _{eq}	RVD ec		Ft/Sec	Velocity Ft/Sec	Remarks
		REF		1.510	6.6	94	13.	793	PLUG	_	IP				and the second s	
936		AX								_/	٠	0.0		•	•	
938				•	4	,					•	₩		•	•	AX TEBURS ON MOS = O AND
939					7.4	7 ⁴ f-					•	0.5		•	,	0.5
940											•			•	•	
	2/6/			1.511							0.01			1687	54	
	2162			1.549							0.52			1610	109	
	2163			1.595							1.14			1635	111	
	2164			1.632							1.63			1576	162	
	2165			1.668							2.11			1559	162	
	2166			1.710							\$ 4.⊊			1567	166	TURB. HISTO. MEASURED
	2167			1.750							3.2/			1509	175	ANALLY ON YOU = 0.5
	2:68			1.795							3.81			1514	185	0
	2169			1-833							4.32			1478	192	
	2170			1.869							4.80			1481	201	
	2171	¥		1.914	V	,	V		[5.60	V		1459	207	

P_r ≈ Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V_{a/c} * Free Jet Velocity

60	MODEL	TEST PT.	P _r o	T _T , o _R	V ^o , ft/s	P ⁱ r	Tr, oR	v _j , ft/s	V _j , ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
	2	1219	3.403	846	1733	3.131	842	1678	1744	845	0	5.29	0.77

	Histo			Positio	n (Volts)	Slant	Axial	Radial	Mean	Turb.	1
No.	No.	of Traverse	Slant Axial		EW	HS	Ax. Pos. X'/h'	Posit.	Posit	Velocity	Velocity	Remarks
	2/72	_AX		1.250	7.474	13.793		5.89	0.5	1442	202	
	2/73			1.994				6.47		1394	219	
	2174		/_	2.030				6.96		1347	224	
- 	2175			2.068				7.46		1296	226	
	2176			2.110				<i>8.</i> ૦.૩		1292	229	
	2177			2,149				8.55		1242	236	TVRO.HISTO. HEASURED
	2178			2.190				9.10		1232	219	ANAUY DN They = 0.5.
	2179			2.233				9.67		1204	219	V
	2180		-	2.268				10.14		1177	239	
	2181			2.3 //				10.72		1171	240	
·	2182		0.507	2.383	<u> </u>			11.28		1142	233	COUTER NO SPLE EXIT
941		RADIAL.		•	-		0.09	/	•	•		
942			0.530					/_			•	
944			1.000	•			1.44	_/_			•	PADIAL TEAURS . NEAR FXIT
			1.000	-	•		Ψ	/				
<i>9</i> (NONCHAR.	1.500			V	2.88	/	•		•	

Pr = Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

 D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V_{a/c} = Free Jet Velocity



MODEL	TEST PT.	P ^o r	TT , OR	V ^o j, ft/s	P ⁱ r	T, OR	v ⁱ , ft/s	v ^{mix} ft/s	TT, OR	$V_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.
2	1219	3403	846	1733	3./3/	842	1678	1744	845	0	5.29	0.77

No.	Histo No.	of Travers	Slant Axial	Axial	n (Volts EW	*	NS	Slant Ax. Pos. X'/h°	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
946		RADIAL	4		9	13.	793	z.88		,		
947			2.000					432	i		•	
948			2.000		•			4	·		•	
949			2.500					5.77	·		•	
250			2.500		•			4			•	
951			3.060		•			7.21	i	-		
952			3.000		•			4	-		•	
953			3.500		•			8.65		•	•	RADIAL TRAVES, NEAR
954			3.500		•			J		•	•	EXIT
255			4.065		•			10.28	•		•	
956			4065					V			•	
957			3708	1				9.25		•	٠	
958			3.708					J	-			
959			SZEE		•			8.22			•	
960			3.3ઽ≳		•				`		•	
961		٧	2.639		٠	V		6.17				

P_r ≈ Pressure Ratio

 V_i = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T [™] Total Temperature

V = Free Jet Velocity

ORIGINAL PAGE IS

MODEL	TEST PT.	P°	Tronga	V ^o j, ft/s	Pr	TT, OR	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	$V_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.
_2	1219	3.403	846	1733	3./3/	842	1678	1744	845	0	5.29	0.77

gelvaradanska samer	-												6
Graph No.	Histo No.	Type of Travers	5lant Axial	Positio Axial	n (Volts EW	1	is	Slant Ax. Pos X'/h°	Posit.	Radial Posit. R/D eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
962		RADIAL	2.639			13.7	93	6.17				•	
963			2.282					5.14		•	•	•	
964			2.282					₹.		•		•	
965			1.962					4.22		•		•	
966			1.962					P		٠	•		
967					•			•		•	•	•	PANIAL TRAVES WEAR FXIT
968								•		•	•	•	
969			1.213		•			2.06		·	•	•	
970			1.213					4		·		•	
971			0.856		•		٠	1.03		•		•	
972		V V	0.856		•			ı	1	٠	-	•	
1053		SLANT		•	4.013			:	•			•	
1054			-	•	J				•	•	•	•	SLOWT AX, TRAVES. ALONG
1057			<u> </u>	•	s.				•	•	•		LINNER AND OUTER NOTTE
1058		V		•	<u> </u>			1	,	•	•	•	LIP-LINES, RESPECTIVELY
	REF-	56.49107 3 19%	0.500	•	•	V	l	CUTER NOT	PLF Ex	T			

MOMENCLATURE

Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

 $D_{eq} = Equivalent Diameter$

 $T_T = Total Temperature$

V ≈ Free Jet Velocity



3	MODEL	TEST PT.	P _r o	T _T , O _R	V ^o j, ft/s	Pr	TT, OR	v ⁱ , ft/s	V ^{mix} ft/s	TT OR	$v_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.
) a	2	1219	3.403	846	1733	3./3/	842	1678	1744	845	0	5.29	0.77

Graph No.	Histo No.	Type of Traverse	£lant	Position Axial	n (Volts EW) NS	Slant Ax. Pos. X'/h°	Posit.	Radial Posit.	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	<i>2</i> 232	SLANT	4.218		5.126	13.440	10.95			1661	50	And the state of t
	2233		4091				10.35			1700	37	
	3234		3.897				9.80			1719	31	
	<u>≥235</u>		3.689	į			9.19			1728	40	
	2236		3,50!	- 1			8.65			1725	35	
	2237		3.298				8.07			1716	૩૩	
	2238		3105				7.52			1718	29	
	2239		2.894				6.91			1700	34	TURB. HISTO, MEASURED
	2240		2.697				6.33			1688	39	SLANT AXIBLLY ON OUTER
	2241		2.497			·	5.76			1685	35	NOTELE LIP-LINE
	2242		2.297				5.18			1684	42	
	2243		2.09Z				4.59			1695	39	
	2264		1.900				4.04			1762	44	
	2245		1.700				3.46			1713	43	
	2246		1.495				2.87			1703	43	
	2247		1.302		4	V	2,31	V		1699	46	

P_r = Pressure Ratio

V_i = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

V_{a/c} = Free Jet Velocity

h = Annulus Height

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්	MODEL	TEST PT.	P ^o r	To, OR	v ^o , ft/s	P ⁱ r	T, OR	v _j , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.	
0.5	2	1219	3403	846	1733	3131	842	1678	1744	845	0	5.29	0.77	•

Graph No.	Histo No.	Type of Traverse	Slant		(Volts) NS	Slant Ax. Pos. X'/h°	Posit	Radial Posit. KVD _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
1	2268	SLANT AX	1.102.		S		1.74			16.9 <u>1</u>	46	TURB. HISTO. HERSURED
	2249 2250	lacksquare	0.905 0.700	/			0.58	/-	/	1681		LIDER LIP- LINE.
1055		SCANT PY	•	,	5.126	13.793						SLANT AY. TRAVES. ALONG
1056		V	-		·	<u> </u>			•		•	CENTERLINE OF OUTER STREAM
						<u> </u>						
							-7. Ed 12.12 (C					
												
								<u> </u> 				

NOMENCLATURE

P_r = Pressure Ratio

 $V_{:}$ = Fully Expanded Jet Velocity

 $T_T = Total Temperature$

V = Free Jet Velocity

D = Equivalent Diameter

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/24/82

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· }																					٣ <u>٢</u>
60	h	MODEL.	TEST PT	. Р	o r	TT,	OR I	'n,	ft/s	P ¹	i r	T	r, e	v _j ,	ft/s	V ^{mix} ft/s	TT, R	V _{a/c} , ft	D _{eq} , in.	h, in.	
06		2	1220	3.4	109	87	3	171	62	<u>3. 1</u>	30		340	16	77	1759	867	400	5.29	0.77	AUTIVNO B 35vd
	Graph	Histo	Туре		Pos	itio	n (Vol	ts)			Slan	t	Axial	Rad	dial	Mean	Turb.				< 40
40.00	No.	No.	of Traverse	Slar	it i	cial	EW		NS	_	Ax. X¹/h	Pos		مو ا			Velocity Ft/Sec		Remarks		
												Charles	eq eq		eq			No. 1 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to 10 to			
			REF].	494	6.70	8	13.81	3	PLU	G 7	·ρ								
11	23		AX		1	-						~~~~	/l	0	.0	•	,)			
مد	24					•	J						•		Į.	•		AY TR	gurs on t	Dag = 0 A	AND
11	125					-	7.50	8					,	0	.5	•	•		RESPECTIVE		
	26					•						\perp	•			•	•				
		22 16			1.0	+91							0.0			2351	108				
		2217			1-	536							0.56			2135	22 Z				
		2218			1.3	דרז							1-11			2243	232				
		2219			1.1	617							1.65			2000	338				
		2220			1.6	556							2.17			2042	300	TURB.	HISTO. MEI	9SUKED A	<i>QNAUY</i>
		222/			1.6	195							2.69			2039	326)eg = 0.5°.		
		2222			1.	733	Ì						3.20			1909	328		U		
		2223		1	1.	778							180			2006	325				
		2224			1.5	313				$\perp \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$			4.27			1828	351				
		2225		<u> </u>		528				_//_		,	4.79			1916	322				
Transaction of the last of the	A communication of Francis	2226	V		1.	9 34	V		4				5.89	<u></u>	V	1818	293				

NOMENCLATURE

P . Pressure Ratio

V_i = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T ≖ Total Temperature

 $V_{a/c}$ = Free Jet Velocity

රි	MODEL	TEST PT.	P ^o r	Tronga	v ^o , ft/s	P ⁱ r	T, OR	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	Va/c, ft	D _{eq} , in.	h, in.	
07	2	1220	3.409	873	1762	3.130		1677	1759	867	400	5.29	0.77	

Grapr No.	Histo No.	Type of Traverse	Slant Axial	Position Axial	(Volts) NS	Slant Ax. Pos X'/h°	Postt.	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
İ	2227	AX	/	2.016	7.508	13.813		6.98	0.5	1669	300	
	2228		/_	2.090				7.97		1525	279	TUPR LUCTO LETOS ASSO DOLLAR
	2229			2.175				9.11		1462	28-7	TURB. HISTO. MEASURED AYIRLLY
	2230			2.252				10.14		1462	287	1
	223/	- ₩	/	2.33/				11.20	V	1363	28-1	
		REF	0,500	1.469	-		OUTERNO	SSCE TIL	•	•	,	
		RADIAL		•			•	. /	•	•	•	
1027			0.530	•	•		0.09	7	•	,	•	
1028			T		•		₩	7	•	•		
1629			0.896				1.14		•	•		
1030			J.				J		•	•	•	
10.3/			1.292	•			2.28		•	•	•	
1032			4	•	·		J.	7		•		CONDITION TO THE TOTAL TO THE TOTAL
10.37			1.670	•	•		3.37	7	·	,		RADIAL TRAVES, NEAU EXIT
1034			J	•	•		V	7		•		
1035		<u> </u>	2.084	•	•	V	4.57					

P * Pressure Ratio

 V_{j} = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V a/c T_{T}^{o} , $R \mid V_{j}^{o}$, ft/s Vi, ft/s Vi, ft/s Tin R $V_{a/c}, \frac{ft}{s}D_{eq}, in.$ MODEL TEST PT. 803 3.409 840 2 873 1762 3.130 1759 867 1677 400 5.29 1220 0.77

Graph No.	Histo No.	Type of Travers	Slant	Position Axial	(Volts	·	NS	Slant Ax. Pos X'/h°		Radial Posit. R/D _{eq}		Turb. Velocity Ft/Sec	Remarks
1036		RADAL	2.054		1	1.3.	813	4.57		<u> </u>			
1037			2.480					5.71			•	•	
1038			<u> </u>		•			J.		·	•	•	
1039			2.876		•			6.85		•		•	
1040			1 1		•			J.					
1041			3.272	•	•			7.99	/_		•	•	RANAL TRAVES. NEAR EXIT
1042			T T					<u></u>	/_		•		
1043			3.668	•				9.13			•		
1064								J.			,		
1045			4.064		•		•	10.28					
1046			<u> </u>	•	•	\	/	J		, ,		•	
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NOMENCLATURE

P = Pressure Ratio

V. = Fully Expanded Jet Velocity

D_{eq} * Equivalent Diameter

 $T_T = Total Temperature$

Va/c = Free Jet Velocity

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/27/82

MODEL	TEST PT.	P _r	T _T , o _R	V ^o , ft/s	P ⁱ r	Tr OR	v ¹ , ft/s	V ^{mix} ft/s	T _T , o _R	$v_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.
2	1220	3409	873	1762	3.130	840	1677	1759	867	400	5.29	0.77

Graph No.	Histo No.	Type of Traverse	Slant		n (Volts EW) NS	Slant Ax. Pos X'/h°	Posit.	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
esta esperante de la compansión de la compansión de la compansión de la compansión de la compansión de la comp		REF	0.500	1.350	2.592	13.414	OUTER M	DESTE T	P	,	•	
1071		AX			4.866			-	1 .		•	
1672					1.00						,	SLANT AX. TRAVES, ALONG INNER
1075	2,		-		5.265		•		<u> </u>	•		ANDONIER NEBSCE LIP-LINES,
107/2							•		•	<u> </u>	•	RESPECTIVELY.
	2273		4.300				10.96			2341	110	
	2274		4104				10.39		·	1697	36	
	2275		3.897				9.79	<u> </u>		1713	29	
	2276		3.697				9.22			1729	33	
	2277		3.485				8.61		•	1730	35	TORB. HISTO. SLANT AKIALLY
	2278		3.30/				8.08	<u> </u>	,	1721	33	MEASURED ALONG OUTER MOTTLE
·	2279		3.087				7.46		,	1712	36	UP-LINE.
	2280		2900	1			6.92	<u> </u>		1705	29	
	2281		2.700	1			6.34	<u> </u>		1686	34	
	2282	٧	2.500	1	V	Ų.	5.77	V		1885	39	

NOMENCLATURE

Pr = Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T [™] Total Temperature

V = Free Jet Velocity

TABLE 5-76

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/27/82

9	MODEL	TEST PT.	P _r o	T _T , O _R	V ^o , ft/s	P _r i	TT, OR	V ⁱ , ft/s	V ^{mix} ft/s	T ^{mix} OR	$v_{a/c}, \frac{ft}{s}$	D _{eq} , in.	'n, in.
10	2	1220	3.409	873	1762	3.130	840	1677	1759	867	400	5.29	0.77

Graph No.	Histo No.	Type of Traverse	Slant Axial		n (Volts)) NS	Slant Ax. Pos. X'/h°	Axial Posit. X/D _{eq}	Radial Posit. R/D eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	2283	SLANT	2.300		5.265	13.414	5.19	/	7	1678	39	
	2284		2./00	7			4.61	/	7	1671	55	
	2285		1.960				4.04	/		1680	55	
	2286		2,300				5.19			1675	40	TURB, HISTO. SLANT BRIALLY
	2287		1.700			·	246			1702	ડ3	MEASURED ALONG OUTER
	2288		1.500				2.88			1684	59	MOZZLE LIP-LINE
	2289		1.300				2.31			1675	65	
	2290		1.100				1.73	_/	<u> </u>	1649	78	
	2291		0.800				0.86	<u> </u>	/	1523	128	
	2292	Y	0.900	/	V	V ·	1.15	!	/	1518	126	<u> </u>
1073		SLANT AX	•	•	5.122	1344	,	,	,		,	SLANT AX. TRAVES, ALING
1074		Į.	•	•	J.	↓	•		<u> </u>		*	OUTER STREAM CENTERLINE
								<u> </u>	<u></u>			
									<u> </u>			
	<u></u>											
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NOMENCLATURE

P_r ≈ Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

D_{eq} = Equivalent Dlameter

 $T_T = Total Temperature$

V_{a/c} = Free Jet Velocity

61	MODEL	TEST PT.	P _r	T _T , o _R	V ^o , ft/s	P _r i	T _T , OR	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D in.	h, in.
)-corts	2	201		-	_	3./4/	855	1693			0	5.29	0.77

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Graph No.	Histo No.	Type of Traverse	Slant Axial	Positio Axial	n (Volts EW) NS	Slant Ax. Pos. X'/h°	Posic	Radial Posit. IVD eq	Velocity	Turb. Velocity Ft/Sec	Remarks
		REF	•	_	5.693	13.381	OUTER NOZ	ELE LIP				
1049		SLANT AX			5.203	\			,		,	SLAUT AY. TRAVES. ALONG
1050		J	•		1		•	•	•	•		THUER STREAM CENTERLINE
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	to publicar mark to the second]		<u> </u>	<u> </u>		l		

P_r = Pressure Ratio

V: = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V = Free Jet Velocity

ල ා	MODEL	TEST PT.	P ^o _r	T _T , o _R	V ^o , ft/s	P _r i	T _T , o _R	V ⁱ , ft/s	V ^{mix} ft/s	T _T ^{mix} , o _R	V _{a/c} , ft	D _{ea} , in.	h, in.
6 3		319	3317	1702				1707			<u> </u>		1

Graph	Histo	Туре		Doctate	/11-14						1 73/3	e 5.29 0.77 3 @
No.	No.	of Traverse	Slant Axial	Axial	on (Volts EW	8) N:	Slan Ax. X'/h	Pos. Posit	Posit	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF AX	/	1.580	6.809	13.89	2 PLUG	718				
1091			/-		 	 		/ 	1.0			
1092				•	V		/		0.0			
1093			-/		7.619				0.5			O.S. RESPECTIVELY
1094				•				•	Į.	-		CIS RESPECTIVILY
1095		SLANT BX	-, 		3.937							
1096					4-7-1		 	/	•	•		
1099					5,363			/	•			SLANT AK TRAIRS ALONG
1100		SCANT AX		/	J		•					THATR/OUTER MEZIELLY- LINES, RESIECTIVELY.
1098					<u>\$.159</u> J	13.8¢	<u> </u>	•				SLANT AK. TRAVES, ALONG
												OUTER STREAM CENTERLINE
												
Philipping and		NOMENCLA	ATURE			The state of the state of						

P_r ■ Pressure Ratio

 $V_i = Fully Expanded Jec Velocity$

 T_T = Total Temperature

V_{a/c} = Free Jet Velocity

 $D_{eq} = Equivalent Diameter$



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MODAL	TEST PT.	P _r ^o	TTOR	V ^o , ft/s	p ⁱ r	T _T , o _R	v _j , ft/s	V ^{mix} ft/s	T _T , o _R	V _{a/c} , ft	D _{eq} , in.	h, in.
3	320	3.318	1704	2455	3./26	866	170/	2282	1513	400	5.29	0.77

Graph No.	Histo No.	Type of Traverse	Slant Axial	Positio Axial	n (Volts	NS	Slant Ax. Pos. X'/h°	Axial Posit. X/D _{eq}	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF			•	13.893	PLUG T	•				
1087		AX		•				•	0.0	•	•	,
1088				•				,	₩		•	AX. TRAVES. ON The =0
1089				,	7.631	·			0.5			AX. TRAVES. OU THE =0 AND O.S. RESPECTIVELY.
1090		4		•		/			J.	•	•	<u>L</u>
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			-					-	· · · · · · · · · · · · · · · · · · ·			
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NOMENCLATURE

P_r = Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Dlameter

T_T [™] Total Temperature

 $V_{a/c}$ = Free Jet Velocity

			,	TABLE 5-	-80			RESULTS I		TEST DAT	E 9/30	/82		ORIGINAL PA
	MODEL	TEST PT.	P ^o r	T _T , O _R	V ^o , ft/s	P ⁱ r	T _T , o _R	V ⁱ , ft/s	v ^{mix} ft/s	T ^{mix} OR	$V_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.	ALITY.
)	3	1319	3.389	870	1755	3.122	847	1681	1742	866	0	5.29	0.77	

				to the supplier of a line of property			و النبسيننيين						
Graph	Histo	Type of			(Volts)		Slant	Axial	Radial	Hean	Turb.	D and -
No.	No.	of Traverse		Axial	EW		NS	Ax. Pos X'/h°	X/D eq	Posit.	Ft/Sec	Velocity Ft/Sec	Remarks
		REF		1.547	6.674	13.	793	PLUG -	718				
1079		AX_							<u>/ </u>	0.0	,	,	
1080				•	V				,	Į.	·		AX. TRAVES, ON YOU =0
1081				,	7.474				,	0.5	<u> </u>		AX. TRAVES. ON YOU =0 AND O.S. RESPECTIVELY
1082		lacksquare			J.	J	<i>j</i> ·		·	J	·		<u> </u>
				ساننا موضعان									
				<u> </u>						<u> </u>			
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NOMENCLATURE

Pr = Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

 $V_{a/c}$ = Free Jet Velocity



TEST DATE 9/30/82

ග	MODEL	TEST PT.	P° r	Tr , OR	V ^o , ft/s	Pr	T, OR	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	$v_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.
15	3	1320	3.416	864	1754	3.126	856	1691	1743	863	400	5.29	0.77

Graph No.	Histo No.	Type of Traverse	Slant Axial	A 1 - 1	(Volts) NS	\$1ant Ax. Pos. X'/h'	Posit.	Radial Posit. R/D _{eq}	Velocity	Turb. Velocity Ft/Sec	Remarks
		REF	-			13.793	PLUG TI					
		AX									,	
1083				•				,	0.0		,	
1084				0	_ ↓			<u> </u>	_1_		,	AND O.S. RESPECTIVELY.
2801					7.482			•	0.5		,	AND O.S. RESPECTIVELY.
1086				•	Ĵ	V		•	<u> </u>			<u> </u>
						200						
												
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				·							مف تهریخ المحموسات مساحد	

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NOMENCLATURE

P_r ™ Pressure Ratio

 $v_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

 $\tilde{t}_{T} = Total Temperature$

V = Free Jet Velocity

TABLE 5-82

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 9/30/82

ORIGINAL PAGE IS

MODEL	TEST PT.	Pr	Tr, OR	V ^o , ft/s	P ⁱ r	T _T , o _R	v ⁱ , ft/s	v ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
3	301	45	_	-	3./28	852	1689	-	-	0	5.29	0.77

Graph No.	Histo No.	Type of Traverse	Slant	A	n (Volts EW) NS	Slant Ax. Pos. X'/h°	Axiai Posit. X/D _{eq}	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		KEF		1.580	6.809	13.842	PLUG T	IP 91				
1077		AX		-		1	,	<u>.</u>	0		,	AY TRAVES ON JET AXIS
1078		J		-			•		J		•	AFTER PLUG
		-			ļ							
			112 to 12 to		<u> </u>							
						<u> </u>					م المسلسل اليون المالي المسلسل المسلسل المسلسل المسلسل المسلسل المسلسل المسلسل المسلسل المسلسل المسلسل المسلس	
					<u> </u>							
					<u> </u>							
											<u> </u>	
								<u> </u>			<u> </u>	
												
	<u> </u>											

NOMENCLATURE

P_r = Pressure Ratio

V = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V re Free Jet Velocity

TEST DATE 10/5/82

	MODEL	TEST PT.	p ^o r	T _T , O _R	v ^o , ft/s	P _r i	TT, OR	vj, ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
13	4	415	3./36	1692	2396	2.918	863	1654	22.43	1521	0	5.57	1.27

Graph No.	Histo No.	Type of Traverse	Slant Axial	Position Axial	(Volts	NS	Slant Ax. Pos. X'/h°	Axial Posit. 文/D _{eq}	Radia! Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	** ** *** *** ***	REF	. 1	1.558	6.881	13.716	PLUG -	TIP				
1129		AX		,				•	0.0	•	•	
1130				•	4			•	J.	•	•	AX. TRAVES. ON YOU = O AND
1131				•	7.709			•	0.5	•	•	O.S., RESPECTIVELY.
1/32				•			7			•	•	
	2317			1.558				0.00		1729	233	
	2318			1.60/				0.55		1595	193	
	2319			1.637				1.00		1598	268	
	2320) (1.683				1.59		1583	226	
	232/			1.720				2.06		1568	202	
	2322			1.761				2.60		1540	143	HISTO, MEASURED BRIBLLY
	2323			1.802				3.10		1556	163	OH Y/Day = 0.5
	2324			1.844				3.63			-	0
	5352			1.886				4.17		1495	160	
	2326			1.924				4.65		1466	161	
	2327	V		2002	V	Y		5.64	V	1396	190	

NOMENCLATURE

P_r = Pressure Ratio

V = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T ∞ Total Temperature

V_{1/s} = Free Jet Velocity

	MODEL	TEST PT.	P ^o r	T _T , O _R	V ^o , ft/s	P ⁱ r	T, OR	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
618	4	415	3.136	1692	2376	2.918	863	1654	22/3	152/	0	5.57	1.27
Gra No	ph Histo . No.		Classi	ition (V	olts)	Slant Ax. P	: Axial	Radia: Posit.		Turb. Velocity		Remarks	

Graph No.	Histo No.	of	Î	Slant Axlal		7	olts EW		¥S	Slant Ax. Pos X'/h°	Axial Posit.	Radiai Posit. K/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	2328	A)K			2.081	7.	70¶	/3.	716		6.65	0.5		-	
	2329				2.081						6.65		1325	195	
	2330				2.163						7.69		1267	195	
	233/				2.238						8.64			***	HISTO HEAS RED AXIAUY
	2332		_		2.238						8.64		1194	232	on Mag=0.5.
	2333			/	2.322						9.71		1157	212	V
	2334				1.542		/				- 0.20	↓	1736	279	
1133		RANA	_	0.500						DUTERNO O.OS	ECE EXT	•			
1134				J	/					₽.	-			•	
1135				0.960	/_					0.80	<u> </u>	•		•	
1136				Į,	/_	<u> </u>	***			J.		٠			
1137			_	1.420						1.61	<u> </u>	·		•	RADIAL TRAVES, NEAR EXIT
1138				4			·			<u> </u>	<u> </u>	•		•	
1139				1.880		<u></u>			-	2.41	•	•		•	
1140				f	/					1	•	•		•	
1141		<u> </u>		2.340	/	1		Y		3.22	<u> </u>	•	•	•	

P = Pressure Ratio

 $V_1 =$ Fully Expanded Jet Velocity

D_{eq} = Equivalent Dlameter

 $T_T = \text{rotal Temperature}$

V Free Jet Velocity



TABLE 5-85

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 10/5/82

ക	MODEL	TEST PT.	P ^o r	TTOR	V ^o , ft/s	P _r	T _T , o _R	V _j , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.	Į a
19	4	415	3.136	1692	2396	2.918	ક્ષઉ	1654	2243	152/	0	5.57	1.27	ļ

Graph No.	Hista No.	Type of Traverse	Slant	Positio Axial	(Volts		NS	Slant Ax. Pos X'/h°		R/D _{eq}	Velocity Ft/Sec		
1142		RADIAL	2.340		•	/3.	716	3,22					
1143			2.800					4.02		•	•	•	
1144	~		1	/_	•			j		•	•	•	
1185			3.260	/_	•			4.82	•	•	•	•	
1146			₩	/_	•			J	•	•	•	•	
1147			3.720		•			5.63	,	•		•	RADIAL TEAVES. WEAR EXIT
1148			J		•			7	•	٠	•	•	
1149			4.180					6.43	•	•			
1150			<u>_</u>					J	•	•	•	·	
1151			4.640	/	•			7.24	•	•	4	•	
1152			J.		,	1		J	•	•	•	•)
													
, i													

NOMENCLATURE

P_r ≈ Pressure Ratio

V_i = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

 $V_{a/c}$ = Free Jet Velocity

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 10/5/82

		,	·										
, maren	MODEL	TEST PT.	P ^o r	T _T , O _R	V ^o , ft/s	Pr	T _T , o _R	V ⁱ , ft/s	V _j , ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
(1) (2)	4	1110	1 11	.105	- 201						s		
0	L	14/3	1.136	1672	2396	2.918	863	1654	22/3	125/	0	5.57	1.27

Graph No.	Histo			Positio	n (Volts)		Slant	Axial	Radial	Mean	Turb.	
NU.	No.	of Traverse	Slant Axial	Axial	EW		NS	Ax. Pos X'/h°	Posit.	Poste	Velocity	Velocity Ft/Sec	Remarks
		REF	0.500		5.677	13,0	140	OUTER NOT	SCE LIP				
1209		_ 		/	5.109					0.0	•	•	
12.10					U U					J.	•		SLANT AX. TRAVES. ON
1123	مبن <u>ن مربح دا این ۲</u>				5.677		<u> </u>	•		0.5		•	TUNER/OUTER HOTELE UP-LINE
	2335		4.827									•	RESPECTIVELY.
	2336		4.827					7.56					
, i	2337		4.827	/_					/			-	
	2338		4.40					6.83					
	2339		4.410				·	<u> </u>	-/		1740		
	2340		3950					6.03	_/		7/70	278	
	234/	-	3.950						/		-	-	HISTO. MEASURED SCANT
	2342	1	3950					_ ↓			1918	25/	AXIALLY ALOLG OUTER NOTELL LIP-LINE.
	2343	1	3.490	/				5.23	/		_	-	add to be
	2365-	1 9	3,030	 				4.42	/		-	-	
	57.57	NUMERU	2.570	lania etimora de la compania	Y		-	3.62		¥	2209	208	

NOMENCLATURE

P_r = Pressure Ratio

 V_i = Fully Expanded Jet Velocity

 $T_T = Total Temperature <math>V_{a/c} = Free Jet Velocity$

D_{eq} = Equivalent Diameter



	MODEL	TEST PT.	P ^O r	Trongar	V ^o , ft/s	P ⁱ r	TT, OR	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	Va/c, ft	D _{eq} , in.	h, in.
n 2	4	415	3./36	1692	2396	2.918	863	1654	2263	1521	0	5.57	1.27

Graph No.	Histo No.	of	Slant	A11	n (Volts) NS	Slant Ax. Pos.	Posit.	Radial Posit.	Mean Velocity	Turb. Velocity	Remarks
en elitate in Andrews		Traverse	AXIOI				X ₁ \/þ ₀	X/D _{eq}	f∜D _{eq}	Ft/Sec	Ft/Sec	
	2346	SCANT	⊋.3¢0		5.677	13440	3.22		0.5	2154	<i>לרו</i>	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	2347		2.110				2.8/			2272	204	
عبد ينجب و حداد	2348		1.880				2.41	/_		2/92	153	·
	2767		1.650				2.0/			حن	***	
·	2320		1420				1.61			2246	200	HISTO, MERSUEED SLOWT
	235/	ļ	1.190				1.2/			2/8/	185	AXIALLY ALONG OUTER
	2352		0.960				0.80	<u> </u>		-	*	MORRE UP-LINE.
	2353		<u>o.730</u>	/			0.40	/		-	-	
	235%		0.530	/			0.05		Ą	1641	128	
1207		SLAWT AX	-		5.557	13.460						SLAUT AX. TRAVES, ASSLUT
1208				•	<u>l</u>	1	•				•	COTTER STREAM COUTERLINE
					1							
								·				
, 							··	<u> </u>				
				auto i i i i i i ca a								

P_r ≈ Pressure Ratio

 $V_j =$ Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V_{a/c} = Free Jet Velocity

TEST DATE 10/6/82

623	MODEL	TEST PT.	P° r	TT , OR	V ^o , ft/s	P _r i	T _T , o _R	v _j , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.	ALITA
12	4	416	3.118	1699	2396	2.922	873	1664	2266	1529	400	5.57	1.27	

No.	Histo No.	of		Slant Axial	Position Axial		olts EW		NS	Slant Ax. F X'/h°) C	Axial Posit. X/D	Pos	it.	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF		0.500	1.558	6.9	26	/3.	823	PLUG	7	IP				300.00.00.00.00.00.00.00.00.00.00.00.00.	
		AX									/	<u> </u>			,	,	
1183					,						\bot		O.	0		,	
1184						Ų	/				\perp		1	,		•	AX. TRAVES. DU X/D= 0
1185					•	7. 7	757					•	0.	5	•	•	AND O.S. KESPECTIVELY.
1186					•						Γ	·			•	•	
	2377				2.32/							5.69			1303	159	
	2378				2.264							8.72			1336	122	
	2379				2.160							7.65			1395	159	
	2380				2.079							6.62			1453	137	
	238/				1.998							559			1,500	138	HISTO MEASURED ON
	2382				1.921							4.61			1520	129	7/2= 0.5
	2383		9		975							1			f	_	
	238K				1.561							0.04			1688	192	
	2385		Macon		1.602							0.56			1646	171	
	2386	V			1.640	J	/	1	Y			1.04			1656	147	

NOMENCLATURE

Pr Pressure Ratio

V; = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V a∕c

= Free Jet Velocity

62	MODEL	TEST PT.	P _r o	T _T , O _R	V ^o , ft/s	P _r i	T _T , o _R	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
ω	4	416	3.118	1699	2396	2.922	873	1664	22 6/2	1529	400	5.57	1.27

(Carrier Contractor				and the second s	the second second second second second second second second second second second second second second second se				 			
	Histo	Type			(Volts)	Slant		Radial	Mean	Turb.	
No.	No.	of	Slant	Axial	EW	NS	Ax. Pos.	Posit.	Posit.	Velocity	Velocity	Remarks
		Traverse	MXIAI			į.	X./II.	X/D _{eq}	R/D _{eq}	Ft/Sec	Ft/Sec	
Zomujet (sp. 1,00 od 190	2387	AX	/	//00	7.757	1 2 0 2 3)		0.5	./ (7)	129	
		- / / /			7.70	13.823		122	0.3	1657		
-	2388		/_	1.718				2.03	ļ. <u> —</u>	1860	128	
	2389			1.680				1.55		1657	139	TURB. HISTO. HEASURED ANGULY
	2390			1.755				2.50		1627	124	ON Man=0.5'
	239/			1.798				3.05		1608	129	
	2392		/	1.86/				3.60		1593	137	
	2393	√		1.877	V			4.05	V	1565	138	
		REF	a500	1.415			GUTER NOT	CE EVIT			•	
1187		RADIAL	0.530				0.05	•		•	•	
1188			. 🖟		•		J	•		•	•	
1189			0.960		•		0.80	•		•	•	
1190			4		•		J	•		•	•	RAPIBL TRAIRS. DEAR EXIT.
1191			1.420		•		1.61	•		٠	•	
1192			J				Ψ.	•		•		
1193			1.880				2.41	•		•	•	
1194		V	ţ				7			•	•	

P_r = Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V = Free Jet Velocity

TEST DATE 10/6/82

on l	MODEL	TEST PT.	P _r o	Tr, OR	V ^o , ft/s	P ⁱ r	T _T , o _R	V _j , ft/s	V ^{mix} ft/s	T _T ^{mix} o _R	V _{a/c} , ft	D _{eq} , in.	h, in.
24	4	416	3.118	1699	2396	2.922	873	1664	2264	1529	400	5.57	1.27

Graph No.	Histo No.	Type of Traverse	Slant Axial	Positio Axial	n (Volts EW) N	s	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. RVD _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
1195		RADIAL	- 2C-			436		en de la companya de la companya de la companya de la companya de la companya de la companya de la companya de					
1196		<i>R/401/4</i> C _m	<u>∠.,140</u>		1	13.8		3.22 V				_	
1197			2.800					4.02	•	•	•		
1198			Ţ					1	•	•	•	•	
1199			3.260		•		·	4.82	•	•	•	•	
1200			J.		·			î	•	•	•	•	PADIAL TRAVES, NEAR
1201			3.720		·			5.63	•		·	•	EXIT.
1202			<u> </u>		•			J	•	•		•	
1203			4.180		,			6.4.3	-	•		•	
1204			J	1			·	J	•	•	•	•	
1051			4.640		,			7.24	•	•	٠		
1206			J		•	<u>V.</u>		+	•		,	•	
				 									
			w. w						-				
													
				and the state of									

NOMENCLATURE

P_r ≈ Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

 $T_T = Total Temperature$

V = Free Jet Velocity

D_{eq} * Equivalent Diameter

TABLE 5-9/

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 10/7/82

Graph No.	Histo No.	Type of Traverse	Slant	Positio Axial	n (Volts EW) NS	Slant Ax. Pos X¹/h°	Axlal Posit. X/D _{eq}	Radial Posit. K/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF	0.530	1392	5.760	13.316	OUTER N	224E	LIP			
/227		SCANT AX			5.278				•		1	
1228					₽.		•		•	•	•	SCAUT AY. TAAYRS, ON THVER
1325					5.846		•		•	·	•	AND OUTER NOTELE UP-LINES
1226			-					•	•	•	•	
	2434		0.575				0.08			-	_	
	5832		0.175				0.08			1649	450	
	26.36		0.730				0.35			1949	164	
	2437		0.960				0.75			2140	165	
	2438		1.190			<u></u>	1.15			2097		TURB. HISTO. MEMSUREO
	2439		1.420				1.56			2205	/35	SANT AXIALLY ON
	2640		1.650				1.96			2227	158	OUTER NOTFLE UP-LINE
	2641		1.880				2.36			2/47	185	
	2442		2.110	1			2.76			2178	200	
6	2443		2.110				2.76			2177	229	
	2646	V	2.//0			- √	2.76		7	2160	220	

NOMENCLATURE

P_r ™ Pressure Ratio

V: = Fully Expanded Jet Velocity

D = Equivalent Diameter

T_T ≈ Total Temperature

V = Free Jet Velocity



TEST DATE 10/7/82

626	MODEL	TEST PT.	P _r o	$T_{\mathbf{T}}^{\mathbf{o}}$, ${}^{\mathbf{o}}$ R	v ^o j, ft/s	P _r i	T _T , O _R	vj, ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
_	4	416	3.118	1699	2396	2.922	873	1664	2264	1529	400	5.57	1.27

#									-			
Graph No.	Histo No.	of Traverse	Slant	Positio Axial	n (Volts EW	NS	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. R/D _{eq}	Velocity	Turb. Velocity Ft/Sec	Remarks
	2445	SLANT AY	s.3 <i>4</i> 0	/	5.846	13,316	3.16		٦	2029	268	
	2446		2.570				3.57		,	2072	27/	
	2447		3.030	/_			4.37			1942	278	TURB. HISTO, MERSURED
	2448		3.490				5.17		·	1871	277	SCANTAXIALLY ON
	2449		2950				5.98			1810	243	OUTER MRRIE LIP-LINE.
	2410		4410				6.78		·	1705	217	
	245/		4.877	/		V	7.60	·	•	1626	193	<u> </u>
1223					5.727	13.316		<u> </u>				SLANT AY. TRAVES. ALONG
1224		₩			1	Ţ			·		•	OUTER STREAM CENTERLINE
				to Banka, and the same								
			· Dank Park Park									
			- Caraller (CA) Procedure	المالية والمالية								
								<u> </u>				
	i i											

NOMENCLATURE

P_r = Pressure Ratio

 $V_{\rm i}$ = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

Free Jet Velocity

al March.

TEST DATE 10/5/82

29	MODEL	TEST PT.	P _r o	Tronga	V ^o , ft/s	P ⁱ r	T, OR	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
-1	4	1415	3,202	853	1703	2.910	855	1644	1694	853	0	5.57	1.27

Graph No.	Histo No.	of		Slant Axial				olts EW	4	NS	Slant Ax. P X'/h°	os.	Posit	Po	lial sit. eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REP			11.5	30	67	19	13	719	PLIJG	7 7	I,P					
1101		_ax												0	.0		•	
102					<u> .</u>							1	•	,	L	•	,	AX. TRAURS. ON YOU = D
1103					<u>.</u>		<u>7.5</u>	<u>57</u>				\perp		0.	5	•	•	AND O.S. PESPECTIVELY
1104								AND THE APPEAR				<u>L</u>				•	•	,
	2226				1.5	<u>}o </u>		-					0.00			1347	164	
	2297				تعبا	25							0.57			1268	161	
	2298	****			1.6	14							1.07			1256	116	
	2299	سور سيند			1.65	67							1.56			1250	105	
	2300				1.69	32				·			2.06			1225	109	
	2301				1.73	3/4							2.59			/223		HISTO, MEASURED AKIALY
	2302		2		1.7	2/							3.06	the Day		1213	106	ON Vibe = 0.5
	2303			<u> </u>	1.81	16							3.63			1202	/03	ð
	230 %			<u> </u>	1.81	18							4.12			1185	122	
	2305	٠			1.8	2/					1		4.59			1165	125	
	2306	₩			1.9.	36	V		\		1		5.16	1		1161	128	

NOMENCLATURE

P_r ™ Pressure Ratio

 $V_{:}$ = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V = Free Jet Velocity



TEST DATE 10/5/82

	MODEL	TEST PT.	P _r	Tronga	V ^o , ft/s	P ⁱ r	T _T , o _R	V ¹ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
628	4	1415	3.202	883	1703	2.910	805	1644	1694	१८३	0	5.57	1.27

Graph No.	Histo No.	Type of	Slant	•	(Volts		Slant Ax. Pos	Axial Posit.	Radial Posit.	Mean Velocity	Turb, Velocity	Remarks
		Traverse	Axial	RKIBI	EW	NS	Χίλμο	X/D _{eq}	R∕D _{eq}	Ft/Sec	Ft/Sec	
ļ	2367	<i>e</i> x		1.973	7.557	13.719		5.63	0.5	1139	128	
	2308			2.009		<u> </u>		6.09		1113	139	
	2309			2.05/				6.62		1088	124	-
	2310			2.093				7.15		Ţ	-	
	2311			2.093				7.15			-	HISTO. HEGSURED ANALLY
	23/2			2.131				7.64		1027	15-8	ON Y/Des = 0.5.
	23/3			2.174				8.18		10 20	163	D
	2314		<u> </u>	2.210				8.64		996	177	
	2315		-	3.255				9.21		55/	178	
	2316	REF	0.500	2.2.90	<u> </u>			7.66	<u> </u>	974	177	
1105		RODIAL	0.530				007ERN633 0.05	CE ENT		-0.0		
1106			<u> </u>	•	•			•				
1107			0.960	•	•		0.80	·	•		•	
1108			4	•	•		<u> </u>	-	·			PANIAL TRAVES NEAR EXT
1109			1.420	•	•		1.6					
1110		V	4		distribution of the second sec	\vee	J		•	•	[

NOMENCLATURE

P_r ≈ Pressure Ratio

V_. = Fully Expanded Jet Velocity

D_{en} = Equivalent Diameter

T_T ™ Total Temperature

V __ = Free Jet Velocity



Graph No.	Histo No.	Type of	Slant	Position	i i	3	NS	Slant Ax. Pos.	Posit.	Radial Posit.	Mean Velocity	Turb. Velocity	Remarks
		Traverse		Axlal	EM	l ii	и́э	Χίλμο	χ/D _{eq}	R/D _{eq}	Ft/Sec		
***	NAME OF TAXABLE PARTY.	RADIAL	ላ ይ-ይ-ህ		•	13.	719	2.4/	470	•	1	•	
1111		12011175	1				//-/ 	V			•	•	
1112			2.360					3.22			•		·
1113			1		•	<u> </u>		J.Z.					
1116						 	<u> </u>	4.02		 	·	,	
1115			2.800			 		¥.02		,		•	
1116					<u> </u>					<u> </u>			
1117	<u> </u>		3. 260 V	 	<u> </u>			4.8·2					RADIAL TRARS. NEAR EXIT
11/8				 	 	-		5.63		-			
1119			3.720			-		3.63			٠.		
1120		 	1		<u> </u>					.			
1/2)			4/80		<u> </u>	┨		6.43		 			
1/22	ļ			<u> </u>		 	ļ	1	 		 	•	
1/23			4.640		<u> </u>	<u> </u>	<u> </u>	7.24	<u> </u>				
1124			l		•			7	11	<u> </u>		· · · · · · · · · · · · · · · · · · ·	
1125			4.877	1/	<u> </u>			7.65	1/		<u> </u>		<u>ှို</u>
1126		1	1	V	1 .		4	. 1	V	·	•		PO N

NOMENCLATURE

P_ ≈ Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D = Equivalent Diameter

 $T_T = Total Temperature$

V_{a/c} = Free Jet Velocity

h = Annulus Height

VAL PAGE IS

ALITY OF HOUSE STATEMENT

	MODEL	TEST PT.	P°	Tronga	V ^o , ft/s	P _r i	T, OR	v ⁱ , ft/s	v ^{mix} ft/s	TT , OR	Va/c, ft	D _{eq} , in.	h, in.
630	4	1415	3,202	853	1703	2.910	228	1644	1694	४८३	0	5.57	1.27

•	_		_								<u> </u>			
	Graph No.	Histo No.	Type of Traverse	Slant	Positio Axial	n (Volts) N	S	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. IVD eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	Assessment of the second		RET-	0.500		5.729	/3.30	2	OUTER NOT	RLE LIP				
	1215		SCAUT AX			5./52			4	٠	•		•	
	12.16			*		J			•	•	•	•	•	SLANT AX. TRANKS. ALONG
	1213			•	7	5.729			•	•				TUNER OUTER NEZZCE LIP-LINE
	1214			•				·	•	٠	•	•		
		2394		4.877					7.65		•	1345	157	
		2395	THE RESERVE TO SHARE THE PARTY OF THE PARTY	4.640					7.24	•	•	1407	15-9	
		2396		4.410	1	\			6.83	•	•	1446	146	
		2397		4.180	1				6.43			1492	185	
	i	2398		3.950	7				6.03	•	•	1517	127	
		2399		3.720	-				5.63	•	٠	1537	123	I HISTO. MEASURED ON OUTER 1957
		22/00		3,4.70					5.23		٠	1557	111	UP-UNE
		240/		3.260	1				4.82		•	1543	128	
		2402		3,030					4.42	-	,	1575	//3	
		2403		2,800	17				402		•	1549	121	
	 	2404	V	2.570	V	1			3.62	•		1630	91	

P_r ≈ Pressure Ratio

 V_i = Fully Expanded Jet Velocity

D = Equivalent Diameter

T_T = Total Temperature

Free Jet Velocity

TEST DATE 10/7/82

6	MODEL	TEST PT.	P ^o r	Tronga	v ^o , ft/s	P ⁱ r	T _T , o _R	V ⁱ , ft/s	V ^{mix} ft/s	T _T , o _R	V _{a/c} , ft	D _{eq} , in.	h, in.
<i>₩</i>	4	1415	3.202	853	1703	2.910	228	1664	1694	દરક	0	6.57	1.27

340 110 880 650 420	. 13.	3°2 3.2 2,8° 2,9 2.0	/ ·		1578 1695	82 78	
\$80 \$50		2, 4	/ .			MAT	
650							í 🎚
		2.0	1	·	1583	6,5	
420	. ! !		<u>/</u>		1694	85	
		1.6	/ .	•	1632		HISTO. MEASURED ON
190	•	1.2	<u>, </u>	٠	1636	70	OUTER NOTELE LIP LINE
160	<u> </u>	0.80		·	1645	86	
730	·	0.60			1501	101	
72		0./3	<u> </u>		240	128	
<u> </u>	5.54.5			•	•		SLANT AX. TRAVES. ALONG
	1	•		·	•	B 1	CUTER STREOM CENTERUNE
							•
							
1 1							

NOMENCLATURE

P_r = Pressure Ratio

 V_{j} = Fully Expanded Jet Velocity

 $T_T = Total Temperature$

 $V_{a/c}$ = Free Jet Velocity

D_{eq} = Equivalent Diameter

TABLE 5-98

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 10/6/82

OF POOR QUALITY :

MODEL	TEST PT.	P°	Tronga	v ^o , ft/s	P ⁱ r	TT, OR	Vj, ft/s	V ^{mix} ft/s	TT , OR	V _{a/c} , ft	D _{eq} , in.	h, in.
4	1416	3.216	878	1730	2909	847	1636	1716	873	400	5.57	1.27

Graph No.	Histo No.	Type of Traverse	Slant Avial		(Volts) NS	Slant Ax. Pos X'/h°	Posit	Radiai Posit.	Velocity	Turb. Velocity	Remarks
de de la companya de la companya de la companya de la companya de la companya de la companya de la companya de	dagir (an ang mai a		**************************************	<i>\s</i> 33	6.736	//	Complete Company	X/D _{eq}	R/D _{eq}	Ft/Sec	re/sec	
157		<i>REF</i> AX ·		,333	6.738	13.676	PLUG TIS	1 .	0.0	*	4	
822					V			•	J.	,	•	AX, TRAVES. ON Youque
159					7592				0.5	•	•	AND O.S., RESPECTIVELY
60				•			 /-	•			*	
	2316			2.373				10.67		1063	146	
	2357			2.290				9.6.2		1099	137	
	232.8		-	2.249				9.10		1107	125	
	2307			2.209				859		1/22_	120	
	2360			2./7/				3.11		1145	120	
	236/		_	2.129			· /	7.57		1155	117	HISTO. HEGURED AXIALLY
	2362			2.090				7.08		1170		GN Y/Dog = 0.5.
	2363		<u> </u>	2.053				6.61		1196	109	0
	2364			2013				6.10		1210	99	
	2365			1.973				5.59		1221	59	
	2366	Y		1.890	₩			454		1234	88	

NOMENCLATURE

P_r = Pressure Ratio

V: = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

V_{c/c} ≈ Free Jet Velocity

හ	MODEL	TEST PT.	P _r	To , oR	V ^o , ft/s	p ⁱ r	T _T , o _R	vi, ft/s	V ^{mix} ft/s	T _T ^{mix} o _R	V _{a/c} , ft	D _{eq} , in.	h, in.
သ	4	1416	3.216	878	1730	2909	847	1636	1716	873	400	5.57	1.27

Graph No.	Histo No.	Type of Traverse	Slant Axial		(Volts	NS	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	2367	ΑX		1.890	7.5-92	13.676	/	4.54	0.5	1263	88	•
	2368		1	1.850			1	4.03		1251	89	
	2369		1 7	1.813	**		/	3.56		1263	90	
	2370			1.775				3.07		1269	89	
	237/			1.732				≥.ऽ3		1282	91	HISTO. HEASURED AKIBUY
	2372			1.691			/	2.00		1304	89	DN 7/00=0.5.
	2373			1.635				1.55		1318	100	D
	2374			1.612				1.00		1303	119	
	2375			1.570				0.47		1400	139	
	2376	Ĭ	/	1.536	4	Ý.	/	0.04	4	1405	145	
		REF	0.500	1.389	8.23/	13.676	OUTER NO	THE LIP	•	•	•	
1161		RADIAL	0.530	/			0.05		•	•	1	
1162			J		•		J.		•	•		AGOIAL TRAIRS NEAR EXIT
1163			0.960				0.80		•	•	•	
1164			J	'/	•		:7		•	•	.•	
1165		L V	1.420			V	1.61		-	•		

P_r = Pressure Ratio

 $V_{:}$ = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V = Free Jet Velocity

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 10/6/82

ORIGINAL PAGE IS

MODEL	TEST PT.	P ^o r	To , OR	v ^o , ft/s	P ⁱ r	T _T , O _R	v ⁱ , ft/s	V ^{mix} ft/s	TT , OR	V _{a/c} , ft	D _{eq} , in.	h, in.
4	1416	3,216	£78	1730	2.909	847	1636	1716	873	400	5.57	1.27

Graph No.	Histo No.	Type of Traverse	Slant		n (Volts EW) NS	Slant Ax. Pos X'/h°	Posit		Ft/Sec	Turb. Velocity Ft/Sec	Remarks
1166		RADIAL	1.42		8.23/	13.676	1.61		•	•	•	
1167			1.88		,		2.4/		•	•		
1168			\$		•		↓		•	•	•	
1169			2.34		•		3.22	•	•	•	·	
1170			y		•	-	J.	•	•	•	•	
1171			2.80				4.02		•		•	
1172	~ · · · · · · · · · · · · · · · · · · ·		V				l l	·	•	•	•	
1173			J.26				4.82	•	•	•	•	RADIAL TRAURS NABR EXIT
1174			<u> </u>				↓ ↓		•	•	•	
117.0			3.72			·	5.63		•	•	•	
1176			_√				J.	•	•	•	•	
1177			4.180				6.43		•			
1178			y		•		J	•	•	•		
1179			4.64	1	,		7.24	٠	•	•	•	
1180		V	b		•		· A	•	•	•	-	
						<u> </u>						

NOMENCLATURE

P = Pressure Ratio

V = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

V_{a/c} = Free Jet Velocity

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

ORIGINAL PAGE 19 OF POOR QUALITY

	MODEL	TEST PT.	P ^o r	T _T , O _R	v ^c , ft/s	P _r i	TT, OR	V ⁱ , ft/s	V _j , ft/s T _T , o _R	Va/c, ft	D _{eq} , in.	h, in.
<u>ව</u>	4	1416	3.216	878	1730	2909	847	1636	1716 873	400	5.57	1.27

Graph No.	Histo No.	Type of Traverse	Slant		n (Volts EW) NS	Slant Ax. Pos X'/h°	Posit.	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF	0500	1.364	5.720	13,320	COTER NO	BRIE O	عوا.			
1221		SCAINT AX			5.164			,	,	,		
1222			•		₽.			<u> </u>		<u> </u>	•	SLANT AX. TRAVES. ON
1219			•		5.720		•		,			TUNER OUTER NOTELE LIP-LIKES
1220			•				•	•	·	<u> </u>	•	RESPECTIVELY.
	2414		4.877				7.65	·	•	1281	160	
	2415		4.640				7.24	•	•	1343	157	
	2416		4.410				6.84	`	•	14-08	146	
	2417		6180				6.43	٠	•	1600	135	
	2418		3.950			·	6.03		•	1492	128	
	24/9		3.720				5.63			15/41	105	TORB HISTO. MEASURED
	2420		3690				5.23	·		1525	103	CLANT AMAILY ON
	2421		3.260				4.82			1598	97	OUTER NOTICE UP-LINE.
	2422		3.030				4.43	•		1224	85	
	2423		2.800				4.02	<u> </u>		1632	50	
	2424	V	2.570	V	V	V	3.62		•	1610	68	

NOMENCLATURE

P_r = Pressure Ratio ·

 $V_{r} =$ Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

V = Free Jet Velocity

63 63	MODEL	TEST PT.	P ^o r	Tr , oR	V ^o , ft/s	P ⁱ r	TT, OR	v ⁱ , ft/s	V ^{mix} ft/s	TT, R	V _{a/c} , ft	D _{eq} , in.	h, in.	QUAL
ő	4	1416	3,216	878	1730	2.909	847	1636	1716	873	400	5.57	1.27	7 2

Graph No.	Histo No.	Type of Traverse	Slant	Positi Axial		lolts EW		NS	Slant Ax. Pos. X'7h°	Posit.	Radial Posit. R/D _{eq}	Hean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	2625	SCANT AX	2.340	A second second	1 5	720	13	}20	3.22		•	1504	74	
	2426		2.110						2.81		•	1659	68	
	2427		1.880						2.61	•	•	1560	66	
	2428		1.650						2.0/			1680	71	
	2429		1.420						1.61	•	•	1629	7.3	TURB. HISTO. MEASURED
	2430		1.190						1.2/	•		1591	8.3	SLANT AXIALLY ON
	2431		0.960			ļ			0.80	-	•	1468	25	OUTER NOTTLE LIP-LINE.
	2432	200	0.730		_				0.40		•	1517	108	
	2833		0.588			4	٩	/	0.15		,	1317	122	SLANT AX. TRAVES. ALONG
217		SLIANT AX	•		S.	544	/3.	320	1			,		OUTER STREAM CENTERLINE
218		<u> </u>	•			1		<u> </u>	•	•		•	•	And the second s

							<u> </u>							
				 	_ _		 -				<u> </u>			
		1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		 			<u> </u>							

P_r = Pressure Ratio

V. = Fully Expanded Jet Velocity

D = Equivalent Diameter

 $T_T = Total Temperature$

V == Free Jet Velocity

MODEL	TEST PT.	P ^o r	Tronga	V ^o , ft/s	P ⁱ r	T _T , o _R	V _j , ft/s	V ^{mix} ft/s	TT, OR	$V_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in
5	511	3.128	1709	2406	2.918	859	1649	2246	1530	0	5.56	1.29

	Histo	Туре		Position	n (Volts)	to Continue	Slant	Axlai	Radial	Mean	Turb.	The street of th
No.	No.	of Traverse	Slant Axial	Axial	EW	15	NS	Ax. Pos X'/h°	Posit.	Posit	Velocity	Velocity	Remarks
		REF	-	1.578	7.034	13.7	713	PLUG TI	/P				
1239		AX		,	<u> </u>				•	0.0	•	•	
12,40					7.839				•	r	•	•	AK-TRAURS, ON YDAG O AND
1241									٠	0.5	•	•	O.S. RESPECTIVELY
1242										Į	•	•	
	26.74			1.580					0.03		2096	166	
	2670			1.620					053		1890	210	
	2476			1.660					1.04		1902	181	
	2627			1.700					1.55		1868	198	
	2478			1.740					2.06		1883	177	HISTO, MEASURED AN ALLY
	2479			1.780					2.57		1832	187	ON 7009 = 0.5
	2480			1.820			-		3.08		1821	202	Ď.
	248/			1.860					3.59		1773	197	
	74.82			1.500					4.10		1712	193	
	2483			1.940					4.61		1670	205	
	ZEPF	l V		2.020	V	L V	to and the same of		5.63	V	1563	219	

P_r ■ Pressure Ratio

 V_i = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

y = Free Jet Velocity

	MODEL	TEST PT.	P ^o r	Tr , OR	V ^o , ft/s	P _r i	T _T , o _R	V ⁱ , ft/s	V ^{mix} ft/s	TT , OR	V _{a/c} , ft	D _{eq} , in.	h, in.
638	5_	511	3.128	1709	2406	2.918	857	1649	2246	Q & 2N,	0	5.56	1.29

A PROPERTY OF THE PARTY OF			Contract of the last of the la	Carlo Company			-		·		·	
Graph No.	Histo No.	Type of Traverse	Slant Axial	Positio Axial	n (Volts EW) NS	Slant Ax. Pos. X'/h°	Posit.	Radiai Posit. RVD eq		Turb. Velocity Ft/Sec	Remarks
	2485°	_AY_		2./00	7.839	13.753		6.64	0.5	1695	22/	
	2686			2.180				7.66		1432	229	HISTO: HERSUREO AXIALLY
	2487		_/	2.260				8.68		1374	25.6	DAI 1/00= 0.5.
	2688	<u> </u>		2.360	<u> </u>	₩	/	9.70	V	1342	240	b
1243		RAWAL		1. 44.48		13.753		-1.65		•	•	
1264				J				1	•	•		
1245				1.461	•			4.49	-	•	<u> </u>	
1246			18 Imma-202	4				4	•	•	-	
1267				1.475	a		/	-1.31			•	
1268				L		-1300000 000000		Ţ	•	-		RANIAL HEAL TRAVES.
1269				1.489	•			-1.13	•	•	•	NEAR EXIT
1520			_/	J	•			J.	•	•		
1251				1.503	•			-0.95	•	•	•	
1525			_/]		•			₽	,	•		
1257				1.517	•		·	-0.78	•	•		
1754		/		J	•	j		J		•	•	

P_r ≈ Pressure Ratio

 $V_{:}$ = Fully Expanded Jet Velocity

 $T_T = Total Temperature$

V = Free Jet Velocity

D_{eq} = Equivalent Diameter

1709

 $P_{\mathbf{r}}^{\mathbf{o}}$

3.128

TEST PT.

511

MODEL

5

639

 T_{T}^{o} , ${}^{o}R \mid V_{j}^{o}$, ft/s

2,406

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

859

1649

TEST DATE /// 4/82

1530

ORIGINAL PAGE IS $V_{a/c}$, $\frac{ft}{s}$ D_{eq} , in. h, in. V_{j}^{i} , ft/s V_{j}^{mix} ft/s T_{T}^{mix} , O_{R}

5.56

Graph	Histo	Туре		Position	(Volts)		Slant	Axial	Radial		Turb.	
No.	No.	of Traverse	Slant Axial	Axiai	EM		NS	Ax. Pos.	Posit. X/D _{eq}	Posit. RVD _{eq}	Velocity Ft/Sec	Velocity Ft/Sec	Remarks
1255		RODIAL		1.531	•	/3.	753		-0.60	and speciments are an interest and an interest	and the second second second second second		
1256				J	•				J.	•		•	
1257				1.262	***				-0.42	•	•		RADIAL HEAD VELOCITY
1528			_/	\	-				J	•	•		TRAVES. NEAR EXIT
1259		-	/	1.573		<u> </u>		/	-0.06	•	•		
1260		<u> </u>		<u> </u>	*	ļ	/				•	•	<u> </u>
		······································	***************************************		·								
		-7///Ed											
				<u> </u>	4	ļ							
							•					·	
			48 (Paris										

NOMENCLATURE

Pr Pressure Ratio

Fully Expanded Jet Velocity

≖ Equivalent Diameter

 $T_T = Total Temperature$

= Free Jet Velocity

640	MODEL	TEST PT.	P _r o	To, oR	V ^o , ft/s	P ⁱ r	TT, OR	v ⁱ , ft/s	v ^{mix} ft/s	TT, OR	$v_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.
	5	511	3.128	1709	2406	2.918	859	1649	2246	1230	0	2.28	1.29

	Histo			Positio	n (Volts)	Slant	Axial	Radial	Mean	Turb.	
Ho.	No.	of Traverse	Slant Axial	Axial	EW	NS	Ax. Pos X'/h°	Posit. X/D _{eq}	Posit. RVD _{eq}		Velocity Ft/Sec	Remarks
		REF	0.200	1.621	5.642	13.332	OUTER A	0876	LIP			
2527		SLANT AX	,		5.452	.	,				•	
3675			•		1							
2569			•		5.636.					•	h	SLANT AS TRAVES, ALDUGOLITES
2570			•		Į į						4	STATEM CENTER-UNE, OWER UP-
257/			•		5.214						q	UNE AND TANER UP-LINE,
2572			4		L						•	RESPECTIVELY.
	882S		0.230		5.636.		0.05			1839	164	
	2587		0.622				0.38			1823	270	
	2550		0.643				6.76			1522	353	
	259/		0.865				1.14			1192	352	HISTO, HEASURED SLANT ANALLY
	2592		1.082				1.52			1180	359	ALONG OUTER IN PRIE UP-LINE
	2523		1.304				1.90			1126	342	
	2594		1.521				2.27			1176	345	
	2595		1.7%3	1			2:66			1350	<i>355</i>	1
	2976	V	1.960		V	V	3.03			1548	365	

P_r ≈ Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

 $D_{eq} = Equivalent Diameter$

T_T = Total Temperature

V = Free Jet Velocity

TABLE 5-107

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

ආ	MODEL	TEST PT.	P ^o r	T _T , o _R	V ^o , ft/s	P _r i	T, OR	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
	5	511	3.128	1709	2406	2.918	859	1649	2246	1530	0	528	1.29

Graph No.	Histo No.	of Traverse	Slant	Position Axial	(Volts) NS	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. KVD eq	Valocity	Turb. Velocity Ft/Sec	Remarks
	≥\$\$7	SCANT AX	2,782		5.636	13,332	3.41			1748	334	
	5228		2.359	/_			3.78	\cdot \int	7	1897	290	
	2559		2.62/	/_			4.17			2003	244	
1	2600		3.060				4.92			2071	197	HISTO, MEASURED SLAWT ANAU
	260/		3060	_/			4.92	/	/	2066	198	ALONG WILL WESTE THE TIME
	2602		3.699	-/			2.68	_/	_/	2097	191	
	<u>2603</u>		3.938	-			6.43	<i>-</i> !	/	2091	182	
	<u>260 (</u> (K185	/			6.81	/	/	2081	175	
	<u> </u>		4377			<u> </u>	7.19		<u>/</u>	2059	179	
												
 												
			-							<u> </u>		
									·		<u>l</u> _	

NOMENCLATURE

P_r ■ Pressure Ratio

V; = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 T_{T} = Total Temperature

Va/c = Free Jet Velocity



642	MODEL	TEST PT.	Pro	To , OR	V ^o , ft/s	P _r i	T _T , o _R	v ⁱ , ft/s	v _j , ft/s	TT R	V _{a/c} , ft	D _{eq} , in.	h, in.
	5	512	3./20	1651	236/	2.910	848	1637	2209	1483	400	5.56	1.29

Graph No.	Histo No.	of Traverse	Slant Axlal	Axlal	eW EW	NS	Slant Ax. Pos Xº/hº	Axial Posit. X/D _{eq}	Radial Posit. R/D _{eq}		Turb. Velocity Ft/Sec	Remarks
		REF	-	1.570	7.05/	13.753	PLUG 7	(P				
253/		ax					/		0.00		•	
2532				•					<u>J</u>	•		AX TRAURS ON YOU O
2533				•	7.890				0.50	•	·	AND O.S. KESPECTIVELY.
12534				•						•		
	7722			1.570				0.00		207/	168	
	25/2			1.610				0.5.1		1836	198	
	251.3			1650				1.02		1833	185	
	2014			1.690				1.53		1813	176	:
	2175			1.730				2.04		1817	174	Y TURR - HISTO . MEASURED
	2516			1.770				227		1785		AKIBUY ON MOSO = 0.5.
	25/7			1.810			/	3.05		177.3	181	-8
	8725			1.850			/	356		1750	170	
	2579			1.890			/	407		1720	181	
ļ	2520			1.930			/	4.58		1710	168	
	252/			2.0/0	Y	¥		5.60	1	1612	176	

P_r ≈ Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

 $V_{a/c}$ = Free Jet Velocity



!	ſ <u></u>		l — — — —	1									
က္	MODEL	TEST PT.	P ^o r	$T_{\mathrm{T}}^{\mathrm{o}}$, T_{R}	V ^o , ft/s	P _r	T_T^1 , O_R	V _j , ft/s	V ^{mix} ft/s	Tr. R	Va/c, ft	D _{eq} , in.	h, in.
င္သ								1637					
•	La	1		1.00	2007	2.770	0 70	103/	2207	1480	400	7.78	1.27

The state of the s					and the state of t		·	·		·		• · · · · · · · · · · · · · · · · · · ·
Grap No.	Histo No.	Type of	Slant		n (Volts	1	Slant Ax. Pos	Axial	Radial	Mean	Turb. Velocity	
ĺ		Traverse	Axial	Axial	EW	NS	X'7h°	X/D _{eq}	K/D _{eq}	Ft/Sec	Ft/Sec	Remarks
Taxanian and and	2522	AX	/	2090	7.890	13.75 }	/	6.62	0.50	1520	7 - 6	
	2523			2.170		13112	/	7.64	0.30	1461	208	
	2524		/	2.250			/	8.66		1394		TURB. HISTO. MEASURED ANALLY
	2525	V	7	2.330	V	J	/	9.67		1363		ALONG May=0.5.
								7.67		1363	209	
		REF	0.200	1.437	8.623	13.754	OUTER N	1-22/15/				
2535		RADIAL		1			0.05	/ /	1			
2536			_\J	/	•		J.	1	/			
2537			0.643		•		0.76	/		•		
2578			J		•		J	/	/_			
2539			1.082		•		1.52			•		200101
2540			J		•		J.		_/_	•		RADIAL TRAVES. NEAR EXIT.
2561			1.52		•		2.27		_/_	•		
25.65			J.	/	•	ĺ	J.	7	/ i			
2583			1.960		•		3.03	7	/	•		
52.kK		V	*			V	J		1	•		
		MOUTHER		1	— — — — — — — — — — — — — — — — — — —		**************************************		the same of the sa			

P = Pressure Ratio

 V_{j} = Fully Expanded Jet Velocity

 $D_{eq} = Equivalent Diameter$

 T_T = Total Temperature

V_{a/c} * Free Jet Velocity



	MODEL	TEST PT.	Pro	T _T , O _R	v ^o , ft/s	P ⁱ r	T _T , o _R	V _j , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
6 4	5	512	3.120	1651	236/	2.910	848	1637	2209	1483	400	5.56	1.29
Territoria de la constitución de	ph Histo	Tune	D - 4	teles /Ne	24 - \								<u> </u>

Graph No.	Histo No.	(ype of verse	Slant Axial	Positio Axiai	n (Volts EW		NS	Slant Ax. Pos. X'/h°	Posie	Radial Posit. R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	₹®. Remarks
2565		RADI	194	2.377		,	13.	5.C.K	3,78				•	
2546				Ų		·			J		•	•	•	
2547				2.838		•			4.54		٠		•	
2568				J.		•			J		•	-	•	
2549				3.≥77		•			6.30		•	•	•	RADIAL TRAVES, NEAR EXIT.
3000				_l		•			J		٠	•	•	
2007				3.716		•			6.05		•	•	•	
<u> 2005</u>				Î					V	1		•		
2003				4155	/				6.81		•	•		
355K		4		V	<u></u>		9	<i>)</i> ·	J	/	•	•	•	
		*		*********										
														·
														
					***				-					
		alikina segunas				Market and I among the complete of the			a na panta a la majora kapana na gana t					

P_r = Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

 $D_{eq} = Equivalent Diameter$

 $T_T = Total Temperature$

 $V_{a/c}$ = Free Jet Velocity



645	MODEL	TEST PT.	P ^O r	Tronga	V ^o , ft/s	Pr	T, OR	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
	5	5/2	3.120	1651	236/	2.910	848	1637	2209	1483	400	5.56	1.29

	Histo		Palet in Accounts:	Positi	on	(Volts)		Slant	Axial	Radial	Hean	Turb.	
Ko.	No.	of Traverse	Slant Axlal			EW		NS	Ax. Pos.	Posit.	Posit	Velocity	Velocity Ft/Sec	Remarks
		REF SLAUT AX	0.200	1.419	7	<u>r.6/2</u>	/3	.3/2	OUTERN	037(E/	P.			
32CC			•		#	s.429							•	
3226			-			J	ļ. <u>.</u>					•	•	SLAUTAY. TRAVES, ALONG CENTER-
2C57			•		- -	5.612		<u> </u>						LINE OF OUTER STREAM BUD
3528			4		- -				•					OUTER NOTSUE ILP-LINE,
	2526		4.155		- -		 -		6.81			2079	179	RESPECTIVELY.
	2527		3.716		╬				6.05	/_		2144	169	
	2528 2529		3.277 3.277		╬				5.30			2182	166	
	2530		3.838		╬				<u> </u>			2185		TUPB. HIS TO. HEASURED
	2537		2.399		╁				6.26			2211	148	SLANT AXALLY ALONG
	27.35		2.182		╬				3.78	-/ -}		2/28	183	OUTER NOTTE IIP-LINE.
	5133		1.960	 	╁				3.4/	-/	-	203/	223	
	253 K		1.960	 	┪				3.03 3.03		/	1917	270	
	503.0		1.743		1	\bigvee	V		2.66	 		1682	267 321	

P_r = Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

V = Free Jet Velocity

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	MODEL	TEST PT.	P ^o r	To, op	V ^o , ft/s	P _r i	TT, OR	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
;	5	512	3.120	1651	≥36/	2.910	848	1637	2209	1483	400	5.56	1.29

Graph No.	Histo No.	Type of Traverse	Slant	Positio Axial	n (Volts) NS	Slant Ax. Pos. X'/h°	Posit	Radial Posit. RVD eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	2536	SLAUT	7.52/		5.6/2	13.312	2.27			1400	304	
	2537	\$ i	1.304				1.90			1108	386	
	3238		1.082				1.52			1429	353	TORB. HISTO. HEASURED SLAUT
	2529		0.865			<u> </u>	1.14	/_		1522		ANALLY BLONG OUTER NOTH
	2540		0.643			· ·	0.76	/_	_/	1805		LIP-LINE.
	2541		0.422				0.38	_/	_/	2082	158	A CONTRACTOR OF THE PROPERTY O
	2542		0.230		<u> </u>		0.05		/	1912	140	
	5263		0.230	/		<u> </u>	0.05	/	/	1894	144	<u>}</u>
								<u> </u>				
-04												
								<u> </u>				
	1			ļ				<u> </u>				

NOMENCLATURE

P_r ⇒ Pressure Ratio

= Fully Expanded Jet Velocity

D_{en} = Equivalent Diameter

T_T = Total Temperature

V ≈ Free Jet Velocity

ග	MODEL	TEST PT.	P ^o r	Tr , or	V ^o , ft/s	P ⁱ r	T _T , o _R	V ⁱ , ft/s	V ^{mix} ft/s	TT, R	Va/c, ft	D _{eq} , in.	h, in.
12 A	5	1511	3.2/2	855	1707	2.911	846	1638	1696	254	0	32.2	1.29

Graph No	Histo No.	ល	f erse	Slan Axla	ARIA	(Volt	7	NS	Slant Ax. Pos X'/k°	. Posit.	Radial Posit. RVD _{eq}	Hean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		RE		C		6.845	13.	63	PLUG T	10				
1215		A)	K		/ -					/ ·	0	•	,	
1216						V				•	J		•	AX TERURS ON YOU =0
1217					•	7.674				•	0.5			AND O.S. PESPECTIVE LY.
1218										•		•	•	
	2453				1.550					0.0		1585	103	
	2454				ı					0.0		1595	102	
	26.55				1.590					0.47		1454	140	
	2456				1.630					0.98		1451	/2-3	HISTO, HEASURED FXIALLY
	2457				1.670			·		1.49		1421	129	- ON YOUN = 0.5.
	2658				1.710					2.00		1420	116	<i>V</i>
	2459				1.750					2.5/		1388	124	
	2460				1.790					3.02		1393	142_	
	2461		-		1.830					3.13		1368	126	
	2462				1.870					403		1354	138	
	2463	4			1.910	₩	1	/	<i>I</i>	454	₩	1338	142	

P_r = Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

 T_T = Total Temperature

V =/c = Free Jet Velocity

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE ///4/82

ORIGINAL PAGE (S)

	MODEL	TEST PT.	P ^o r	Tron R	v ^o , ft/s	P _r i	T, OR	v _j , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.	Ang S
348	<u>5</u>	1511	3.2/2	228	1707	2.911	846	1638	1696	854	0	5.56	1.29	ALIT

			Announced	Andrews Marketon				-	1	1	-		A TOTAL CONTRACTOR OF THE PARTY
Graph No.	Histo No.		ype of	Slant	. 2	on (Volts	<u>}</u>	Slant		Radial		Turb.	
	1 110.		B	a Axial		EM	NS	X'/h°	POSIT.	Posit.	Velocity Ft/Sec	Velocity Et/Sec	Remarks
			Sent University						₩D _{eq}	R/D _{eq}	1 67 366	12/386	
	2466	A	<u> </u>		1.950	7.674	13.63		5.05	0.5	1322	144	
	2465				1.990	i i		and the same of th	5.56		1289	164	
	2466				2.030				6.07		1245	159	1
	2867				3.070				6.58		1233	158	HISTO, MEASURED ANIAWY
	2468				2.110				7.09		1199	185	ON 1000 = 0.5.
	2469				2.150				7.60		1175	188	
	2670				2.190	′			8.11	1	1147	180	
	2471				2.230				8.62		1142	179	
-	2673	Same of the last		-	2.270	<u> </u>			9./3		1120	181	
	2477	<u></u>		A James	2.3/0	A			9.64	V	1102	185	, j
1219		PAOL	AL	5.130	1.417	3.411		O.O.4	FILE E	<u>€</u> T.			4
1220					·	,		J		·	•		
1221		<u></u>		2543				0.76		·	`	•	RAD, TRAVES, NEAR EXIT
1222					,	.		J.		·	·		And the state of t
1223			 	0.982		•		1.5-1				•	
1224		<u> </u>	4			, ,	1 4		7			•	

NOMENCLATURE

P_r = Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

T_T [™] Total Temperature

V = Free Jet Velocity

		·····			,									<u>م</u> بد
64	MODEL	TEST PT.	$\mathbf{P_r^o}$	T _T , O _R	V ^o , ft/s	P _r	T _T , o _R	V _j , ft/s	V ^{mix} ft/s	TT, OR	$v_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.	QUAL
ට	<u>5</u>	1.511	3.2/2	855	1707	2.911	846	1638	1696	228	0	5.56	1.29	20

Graph No.	Histo No.	Type of Traverse	Slant	Positio Axiai	n (Volts	F	NS	Slant Ax. Pos. X¹/h°	Posit.	R√D _{eq}	Velocity Ft/Sec		Remarks
1225		RADIAL	1.421	• /	• /	/3.	630	2.27	1			•	
1226			₩					J	7		•	•	
1227			1.860					3.02		•			
/228			ţ					J		·			
12.2.9			2.299					3.78		٠	•	•	
1230			J.					Ţ		•	•		TRAD. TRAURS. NEAR EXIT
1231			2.738				- Terrorio	4.53		,	•		
1235			<u> </u>		/			1		•		•	
1233			3,177					5.29		•	•	•	
1234			<u> </u>					J.		•	•	•	
1235			3.616					6.04		•	•	•	
1236			<u> </u>					V			•	•	
1237			4.055		<i></i>			6.80		•	•	•	
1238					·	₩		J.		•	•	•	
	and a Colomby and a				and the state of t								

P_r
■ Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V = Free Jet Velocity

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

65	MODEL	TEST PT.	P° r	Tronga	V ^o , ft/s	P ⁱ r	Tr, oR	vj, ft/s	v ^{mix} ft/s	TT, OR	Va/c, ft	D _{eq} , in.	h, in.	ALLIA
0	5	1511	3,2/2	855	1707	2.911	846	7638	1696	854	0	5.56	1.29	

Graph No.	Histo No.	of Traverse	Slant Axial	Axial	n (Volts		NS	Slant Ax. Pos. X'/h°	Posit. 刈D _{eq}	R/D _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF	0.200	1.392			242	OUTER ME	re up			er Derjoya de esta de la Compación de la Compa	
2563		SLANT AN			5.256						•	•	SLAUT AX TRAVES, ALONG
2584			•		<u> </u>	<u> </u>		-			•	•	CENTERLINE OF OUTER STREAM
2565			•		5.450			•				•	SLANT AY. TEAURS, ALONG
2566								<u> </u>			•	•	NOTER NOTTLE LIP-LINE.
	25%5		0.230					0.05			1455	84	
	2566		0.622					0.38			1625	76	
	2567		0.643					0.76			1450	207	
	2568		0.865					1.14			1178	249	
_	2569		1.082					1.52			1175	246	LISTO, MEASURED SCANT
	2570		1.304					1.90			1255	266	ANALLY ALONG OUTER
	2571		1.52/					2.27			1082	249	NOSSIE 110-UNE
	2572		1.743					2.66			1158	240	,
	2573		1.743					2.66	IL		1161	258	
	2574		1.960					3.63			1261	250	
	2575	V	2./82		V	7	V	3.41			1337	22/	

NOMENCLATURE

P_r = Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

T_T = Total Temperature

V = Free Jet Velocity

TABLE 5-117

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE ///9/82

n. h, in. Lity

	MODEL	TEST PT.	P ^o r	TT, OR	V ^o , ft/s	P ⁱ r	T _T , o _R	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	$V_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.	AGE S
551	5-	1511	3.2/2	855	1707	2.91/	846	1638	1696	85 L	0	5.56	1.29	

No.	Histo No.		Slant		n (Volts EW) NS	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. IVD eq	Mean Velocity Ft/Sec		
	2076	SLANT AX	2.399		5.450	13.262	3.78	1		1496	200	
	2577		2.62/				4.17			1567	152	
	2578		2.838				424			1572	138	·
	2579		2060				4.92		:	1613	11.3	
	2580		3.277				5.30			1610	103	
	32 <u>8</u> 1		3689				5.68			1616	99	HISTO. MEASURED SCANT
	5225		3716				6.05			1612	100	AMALLY ALONG OUTER
	2583		3.938				6.43			1599	110	NOZZIE LIP-LINE
	2184		8.155				6.81			1587	110	•
	25825		4377			·	7.19			1572	118	
	2586		1.52/				2.27			1030	248	
	2587		1.30 4		V	V	1.90	1		1030	<i>243</i>	J
				1	<u> </u>							
				1								

NOMENCLATURE

P = Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$

D_{eq} = Equivalent Diameter

T_T = Total Temperature

V_{a/c} ■ Free Jet Velocity

MODEL	TEST PT.	P ^o r	Tronga	V ^o , ft/s	P ⁱ r	T ¹ , OR	V _j , ft/s	V ^{mix} ft/s	Trix OR	Va/c, ft	D _{eq} , in.	h, in.	
2 0	1514	3,214	897	1749	2.919	865	1656	1734	892	400	526	1.29	ALITY SE SO

Cranh	Histo	Tues		-	141-141-	_ (1		<u> </u>		C14		A . P . 1		11-1			
No.	No.	Type of Traver		Slant Axial			EW	~~~	NS	Slant Ax. Po X'/h°	5.	Axial Posit. X/D eq	Po		Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		PEE		-	1.545	6.	867	/3.	6 65 -	PL119-	I	, p					
1261		_&X_		·							1		0	.0	•	•	
1262							V				L			J	•	•	AX. TRAURS, ON 1/0:5=0
1263			THOUSAND IN			7.	706						0	.5	•	•	AND O.S. RESPECTIVELY.
1264	-				•]								•	•	
	2689				1.562							0.00			1599	99	
Wis a windows	2490				<u> </u>							V			1597	97	
	2491				7.82.1		<u> </u>					0.5/			1443	131	
	2492	- 10.0× '2* - 4.2 - 10.			1.625							1.02			1447	109	
	2453				1.665				·			723			1423	108	HISTO. HEASURED AXIALLY
	2854			<u> </u>	1.705							2.04			1426	104	F ON 7/0-9=0.5.
	<u> </u>			1	1.745		<u> </u>					255	-		1403	102	V
	2656		_	<u> </u>	1.785		<u> </u>		1			3.05			1401	///	
	2497				1.825					1	_	356			1382	112	
	2498		_		1.865		<u> </u>			<u> </u>		4.07			1375	111	<u></u>
	2499	V	/		1.905	resource.	Y	190000		I	j	822	1		1346	110	

P_r ≈ Pressure Ratio

 V_{i} = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

 $V_{a/c}$ = Free Jet Velocity

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\mathcal{C}	MODEL	TEST PT.	P _r o	T _T , o _R	v ^o , ft/s	P _r i	T _T , o _R	V _j , ft/s	V _j , ft/s	TT , R	V _{a/c} , ft	D _{eq} , in.	h, in.	PAGE
ξ.5	5-	1514	3.214	897	1749	2,9/9	298	1656	1734	892	g Goo	5.56	1.29	70

Graph No.	Hista No.	Type of Traverse	Slant Axlal	Axiai	(Volts) NS	Slant Ax. Pos X'/h°	Posit	Radial Posit. R/D eq	Velocieu	Turb. Velocity Ft/Sec	
	2000	_ax_		1.945	7.706	13.645	/	5.09	0.5	1333	121	
	2Co/			1.985				5.60		1298	130	
	2502			2.025				6.11		1266	132	
	5.00.3			2.065				6.62		1258	140	
	300 E			2.105				7./3		1223	13.5	HILTO, MEASURED AXIALLY
	200C		_/	2.145			/	7.64		1213	133	ON MOSS = D.5
	হত্ত			2.185				8.15		1203	141	
	250.7			2.225				8.66		1190	158	
i	2008			2.265				9.16		1165	157	
	2509			2.305			<u> </u>	9.67		1155	157	
	25/0		-	5.362	4		/	10.18	\bigvee	11.38	159	
				<u> </u>								
												
												
												

NOMENCLATURE

P_r = Pressure Ratio

 $T_T = Total Temperature$

 V_{i} = Fully Expanded Jet Velocity

Va/c = Free Jet Velocity

D_{eq} = Equivalent Diameter



TEST DATE ///5/82

රු	M^DEL	TEST PT.	P ^o r	Tr , oR	v ^o , ft/s	P ⁱ r	T _T , o _R	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
£ 75.	5	1514	3.216	897	1769	2.919	865	16.56	1734	892	600	5.56	1.29

	Histo	Type		Positio	n (Volts)	3.967-20 4 7-574	Slant	Axlal	Radial	Hean	Turb.	
No.	No.	of Travers	Slant Axlal	Axial	EW		NS	Ax. Pos.	Posit. X/D _{eq}	Posit. R/D _{eq}	Velocity Ft/Sec	Velocity Ft/Sec	Remarks
		REE	0.200	1.416	8.601	13.	ያትΓ	OUTER N	357£ (1	ρ			
	~~~	RADIAL				<u> </u>							
25-1/		-constant of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the s	0.230					0.05		•	•	·	
25/5			J		<u> </u>			V		•	•	•	
25/3			0.643					0.76		9	•	•	
25/4								J		•	•	•	
52/2			1.082		•			1.52		•	•		
2016					•			J		•		•	
2517			1.521		•			2.27		•		,	PAOIAL TRAIRS. NEAR EXIT
278			l J		•		·	J		•	•	•	
2519			1.960		•			3.03		•	•	•	
2520			L L		۰			J		•		•	
7521			2.399		•			3.78		•			
2522			<u> </u>		•			J		•	•	•	
2023			2.838		•			454	1	•	,	,	
2528			1		•	1		Ĵ		,	٠	•	

# NOMENCLATURE

P = Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$ 

D = Equivalent Diameter

 $T_T = Total Temperature$ 

V _ / = Free Jet Velocity

	MODEL	TEST PT.	P ₁	TT , OR	V ^o , ft/s	P ⁱ r	T _T , O _R	V ⁱ , ft/s	ν ^{mix} ft/s	Tr, oR	V _{a/c} , ft	D _{eq} , in.	h, in.
O U	5	1514	3.214	897	1749	2.919	865	1656	1734	892	400	5.56	1.29

Graph No.	Histo No.	Type of Traverse	Slant	A	 (Volts)	NS	Slant Ax. Pos. X'7h°	Axial Posit. X/D _{eq}	Radial Posit. FVP eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
57.5		RACIAL	3.277		•	13.645	\$.30	1	•	•	•	
2526			<i>\$</i>		•	ĺ	1	7	•	•	•	
2527			3.716		•		5.05	/	•	•	٠	, RADIAL TRAURS, WEAR THIT
2528			J		•		J		•	•	•	
2529			4.155	$J_{-}$	•		6.81	7	•	•	•	
2530		V	J.	1	•	V	J	/	•	•	•	
							<u> </u>					
				-								

P_r = Pressure Ratio

T_T = Total Temperature

 $V_{:}$  = Fully Expanded Jet Velocity

V = Free Jet Velocity

D_{eq} = Equivalent Diameter

65	 TEST PT.	P ^o r	T _T , o _R	V ^o , ft/s	P ⁱ r	Tr, oR	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	$v_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.
ථා	 1514	3.214	897	1749	2.919	865	1656	1734	892	400	5.56	1.29

Graph No.	Misto No.	Type of	Class	Positic	u (Ao	lts			Slant		Radia		Hean	Turb.	
	10.	Travers	Slant Axial	Axiai	E	H		NS	Ax. Pos	Posit.	RVD ec	t. q	Velocity Ft/Sec	Velocity Ft/Sec	Remarks
		REF SLAUT	0.200	1.392	<u> </u>	6	/3.	2 <i>70</i>	OUTER M		<u> </u>	Ţ			
2559		AX.				_		ļ 	•			$\perp$	0		
					S. 27	<u>/6</u>			•	<b> </b> /		$\bot$	4	•	
2560					<u> </u>	_	<del></del>		•			Ц			SLAUT AY TRAVES ALONG
2561					5.45	9			•				•	•	CENTER-LINE OF OUTER STREAM
2562									•				•	•	AND DLONG OUTER NOZZLE
	52.6.E		0.230						0.05				1434	96	WP-LINE.
	SUFU		0.422				نی		0.38				1526	//3	and the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of th
	2146		0.643						0.76				1187	236	
	2547		0.865				ļ		1.14		1		995	229	
	3LF8		1.082						1.52		7		1001		INCED MERCE AND ASSESSED.
	25.6.8		1.082						V		7		1018	204	HISTO MEASURED ALONG
	2510		1.304						1.90	7		7	1073	242	OUTER NOTELE LIP-LINE.
	255/		1.52/						2.27		1	1	958	204	
	2222		1.763						2.66	1	1	十	1/30	24/	
	5773]	Y	1.960		V		V		3.03	1	<del> </del>	1		226	3-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1

P_r ™ Pressure Ratio

 $V_{i}$  = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$ 

 $V_{a/c}$  = Free Jet Velocity



	MODEL	TEST PT.	P _r	TT, OR	v ^o , ft/s	Pr r	T _T , o _R	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
֓֞֞֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	5	1514	3.214	897	1749	2.919	268	1856	1734	892	400	5.56	1.29

No.	Histo No.	of Traverse	Slant	Positio Axial	N (Volts	NS	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. R/D eq	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	3228	SLANT AX	2./82		5.659	13.270	34/			1383	205	
- 1	2222		2.399				3.78			1474	165	
	उट्टर	44417-0-7-1	2.62/				417			1503	120	
	2227		2.838	/_			454	/_		1531	116	
	8175		3.060				492			1557	98	HISTO. MEASURED SCANT
	\$22S		3.277	/			5.30			1583	92	ANALLY ALONG OUTER
	2560		3499				5.68			1567	99	NERSCE LIP-LINE.
	2561		3.716				6.05			1542	103	
	2062		3.438	<u> </u>			6.43	<i></i>		1558	104	
	243		4122	<i> </i>			6.8-1	<u> </u>		1548	105	
	206 (C	<u> </u>	4.377		<u> </u>	V	7.19	1		1527	10/	<u> </u>
			-	<del> </del>					-11-11			
				<del></del>								
				<del>(0.0.0.) </del>								
				<del></del>								

P_r ≈ Pressure Ratio

 $V_{j}$  = Fully Expanded Jet Velocity

 $T_T = Total Temperature$ 

V_ = Free Jet Velocity

D_{eq} = Equivalent Diameter



6	MODEL	TEST PT.	P ^o r	Tronga	V ^o , ft/s	P _r i	TT, OR	v ⁱ , ft/s	V _j , ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
00	6	619	3.302	1689	2439	3.119	87/	1705	2289	1523	0	5.23	0.62

Graph No.	Histo No.	Type of	Slant	9	n (Volts	100	- Andrews	Slant Av Bo		Radial	Mean	Turb.	
		Travers			EW	N	S	X'7h'	S. Posit. X/D eq	R/D eq	Ft/Sec	Velocity Ft/Sec	Remarks
		REE		L578	6.85 4	13.6.	<u>38</u>	PLUG	TIP				
		_AX							<u> </u>				
3016		*****		•					<u> </u>	0.0			AX. TRAVES. ON The = 0
7017				-	<u> </u>					4		•	
3018				,	7.248					0.25			AY TRAVES ON YOU = 0.25
3019				•	<u> </u>					<u> </u>			i
3020				•	7.64Z					0.5		•	AX. TRAVES ON YOUR =0.5
302/				7									) 0
	300/			2.3/4					9.96		1309	295	
	3002			2,234			·		88.8		1416	312	
	3003			2.154					7.79		1472	340	
	3004			2.074					6.71		1595	330	TORB HISTO. MEASURED
	2005			1.994					5.63		1662	3/7	BXIALLY ON MOSE = 0.5
	3006		<b> </b>	1.814			[	<del> </del> _	855		1756	333	0
	3007		<b> </b>	1.874			[	<u> </u>	4.01		1807	305	
	3000	V		1.874	V	V		<i> </i>	4.01	V	1827	296	

P_r ≈ Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$ 

D_{eq} = Equivalent Diameter

T_T ≈ Total Temperature

V___ = Free Jet Velocity



TABLE 5-125

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE ///2/82

6	MODEL	TEST PT.	P ^o r	Tr , or	V ^o , ft/s	P ⁱ r	T, OR	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
59	6	619	3302	1689	2439	3.119	87/	1705	2289	1.023	0	5.23	0.62

Grapi No.	Histo No.		\$lant Axial	Axiai	n (Volts EW	) NS	Slant Ax. Pos X'/h°	Posit	Radiai Posit. RVD eq	Valenter	1	
	3009	_4X_	/		7.642	13.638	/	3.46	0.5	1837	3/8	
	3010			1.794			/	2.92		1880	297	
	30//			1.754			/_	2.38		1833	319	
	3012			1.714			/	1.84		1929	270	TORB. HISTO. MEASURED
-	30/3			1.674			/	1.30		1827	292	TORB. HISTO. MEASURED BXIALLY ON YOUT = 0.5.
	3014		-/	1.634			_/	0.76		1961	_253_	V
	3015		1	1.594	V		/	0.22		1836	248	
	3016			1224		_√		-0.32	- ∜	1992	227	<u> </u>
					-							ret d'annage d'anna ann ann ann ann an an an ann an an
							<del></del>					
					ر							
					·							

#### NOMENCLATURE

Pr = Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$ 

D_{eq} ≈ Equivalent Diameter h ≈ Annulus Height

T_T = Total Temperature

V_{a/c} = Free Jet Velocity

RIGINAL PAGE 18

	MODEL	TEST PT.	P°r	To, oR	V ^o , ft/s	P _r i	TT, OR	vj, ft/s	v ^{mix} ft/s	TT, OR	Va/c, ft	D _{eq} , in.	h, in.	
න න	6	620	3.317	1710	2459	2145	868	1707	230×	1538	600	5.23	0.62	

Graph No.	Histo No.	Type of Traverse	Slant	Position Axial	(Volts	, —	NS	Slant Ax. Pos. X'/h°	Posit.	Radiai Posit. K/D _{eq}	Hean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
(a) A(G-32-198)		PEF	0.200	1578	6905	7.3.	594	PLUG TIF	)				
3010		AX	•	•	7.693				•	0.5		•	BY TRAVES. ON Mos = 0.5.
3011		J	•	9	J.			•	•	1			V
30/2		SCANT AX	•	•	•				•	,		,	SLAUT AY. TRAVES. ALDING OUTER
3013		J		•		<u> </u>	<b>y</b>		•				NOZZE UP-LINE.
			والمال الكالم والمواد المالة										
		·		40-politica (market)		 				<u> </u>			
· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·					<del></del>						
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						<del>                                     </del>				<del> </del>	<u> </u>		
				**************************************		<del>                                     </del>				<u> </u>			
-	<u> </u>				<u> </u>	-	27			<del> </del>			

## NOMENCLATURE

P_r = Pressure Ratio

 $V_i$  = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

T_T = Total Temperature

TABLE 5-126

V = Free Jet Velocity

6	MODEL	TEST PT.	P ^o r	Trong	V ^o , ft/s	P _r i	T, OR	V ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c'} ft	D _{eq} , in.	h, in.	!
0	6	649	3.335	1687	26.86	1.797	1348	1585	2356	1652	0	5.23	0.62	

Graph No.	Histo			Position	n (Volts	)		Slant	Axial	Radial	Mean	Turb.	
no.	No.	of Traverse	Slant Axial	Axiai	EW	NS	3	Ax. Pos X'/h*	Posit. X/D _{eq}	Posit. RVD eq	Velocity Ft/Sec	Velocity Ft/Sec	Remarks
180-0-0-		REF	- /	1.581	6826	13.61	9	PLUG 7	P				
3022		AX				ļ			•	0.00		4	AN TOOLOG AN Your
3023					¥		201 200			ų.		•	AX. TRAVES. ON Moy = 0.
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	3024			2.131					7.44	,	1572	305	
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Pr Pressure Ratio

 $V_i = Fully Expanded Jet Velocity$ 

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$ 

V = Free Jet Velocity

TABLE 5-128

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE 1//12/82

POOR QUALITY

₩	MODEL.	TEST PT.	P ^o r	T _T , O _R	V ^o j, ft/s	P ⁱ r	T _T , O _R	v ¹ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.	R QU
362	6	649	2335	1687	2446	1.797	1348	1.085	2356	1652	0	<b>5-23</b>	0.62	ALL L

Graph Ko.	Histo No.	Type of Traverse	Slant	Position Axial	(Volts	NS NS	Slant Ax. Pos. X'/h°	Posit.	Radial Posit. RVD _{eq}	Hean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
	3026	_AX	•	1.775	7.614	13.619	,	2.625	0.50	1923	279	HISTO, MEASURED BAIRLY
	3027		•	1.692	1		•	1.502		1989	246	ON MORE = 0.5.
	3028	<i></i>	•	1.612	J	J.	•	0.419	J	2016	202	
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## NOMENCLATURE

P_r = Pressure Ratio

 $v_j$  = Fully Expanded Jet Velocity

)_{en} = Equivalent Diameter

T_T ™ Total Temperature

V = Free Jet Velocity

TABLE 5-129

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE /////82

	MODEL	TEST PT.	P _r	Tr , OR	V ^o , ft/s	P ⁱ r	TT, OR	v _j , ft/s	v ^{mix} ft/s	TT, OR	$V_{a/c}, \frac{ft}{s}$	D _{eq} , in.	h, in.
රි	6	1619	3.397	871	1757	3./22	864	1698	1748	870	0	5.23	0.62

No.	Histo No.	Type of Traverse	Slant		(Volts)	-	NS	Slant Ax. Pos. X'/h°	Axial Posit. X/D _{eq}	Radial Posit. RVD _{eq}	Mean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF	0.200	१८८३	6.767	13.6	300	PLUG TI	p				
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### NOMENCLATURE

Pr Pressure Ratio

 $V_{i}$  = Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$ 

V = Free Jet Velocity

AERODYNAMIC TEST RESULTS BY LASER DOPPLER VELOCIMETER

TEST DATE /////82

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	MODEL	TEST PT.	P <b>o</b>	TT, OR	V ^o , ft/s	P ⁱ r	T _T , o _R	v ⁱ , ft/s	V ^{mix} ft/s	TT, OR	V _{a/c} , ft	D _{eq} , in.	h, in.
99	66	1620	3.412	875	1764	3.130	867	1703	1754	874	400	5.23	0.62

Graph No.	Histo No.	Type of Traverse	Slant		n (Volts EW	NS	Slant Ax. Pos. X'/h°	Axial Posit. X/D eq	Radial Posit. PVD _{eq}	Hean Velocity Ft/Sec	Turb. Velocity Ft/Sec	Remarks
		REF	0.200	1552	6.745	13.624	PLUG T	P				
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NOMENCLATURE

P_r = Pressure Ratio

 $V_i =$ Fully Expanded Jet Velocity

D_{eq} = Equivalent Diameter

 $T_T = Total Temperature$

V = Free Jet Velocity



5.2.3 LV Mean Velocity Traces

5.2.3.1 Mean Velocity Traces of DFSC-1

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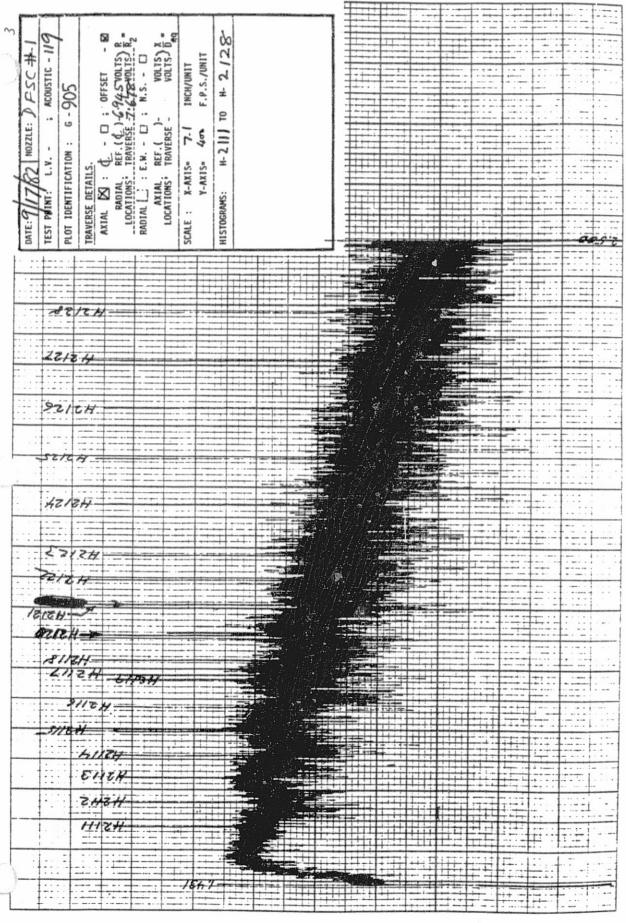
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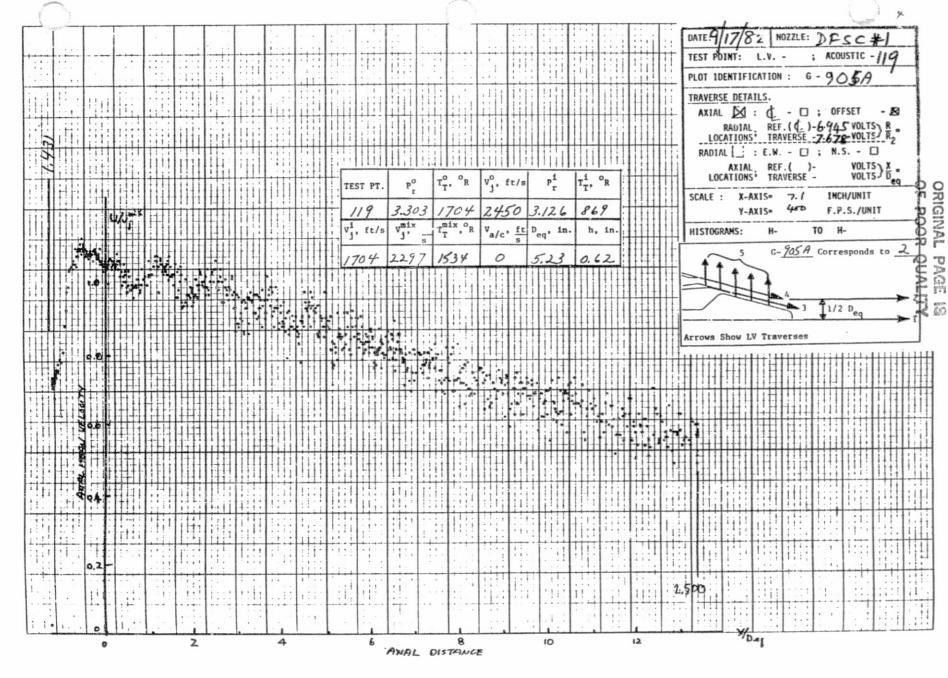
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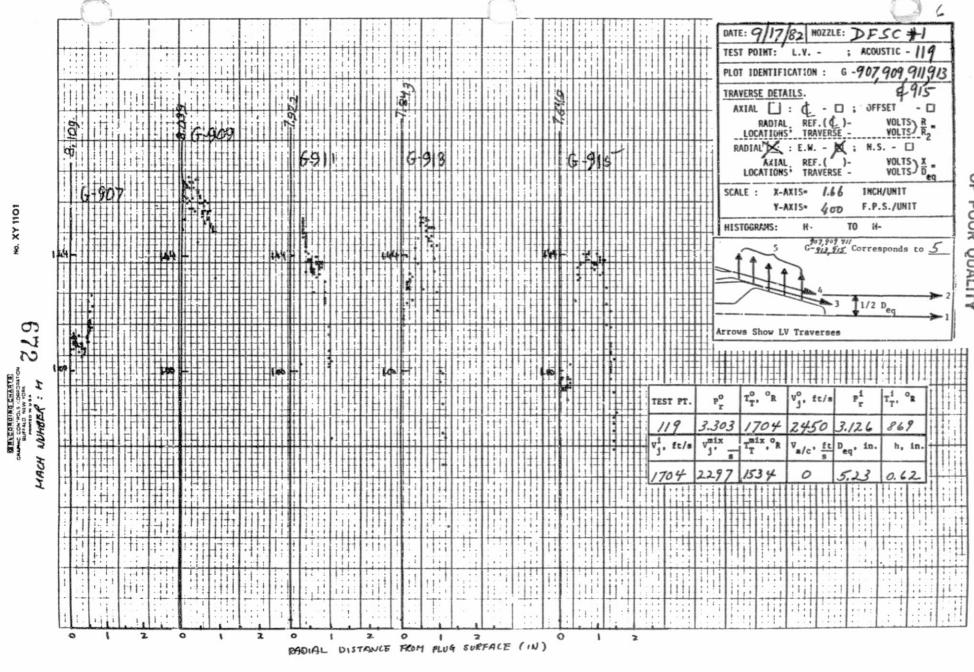




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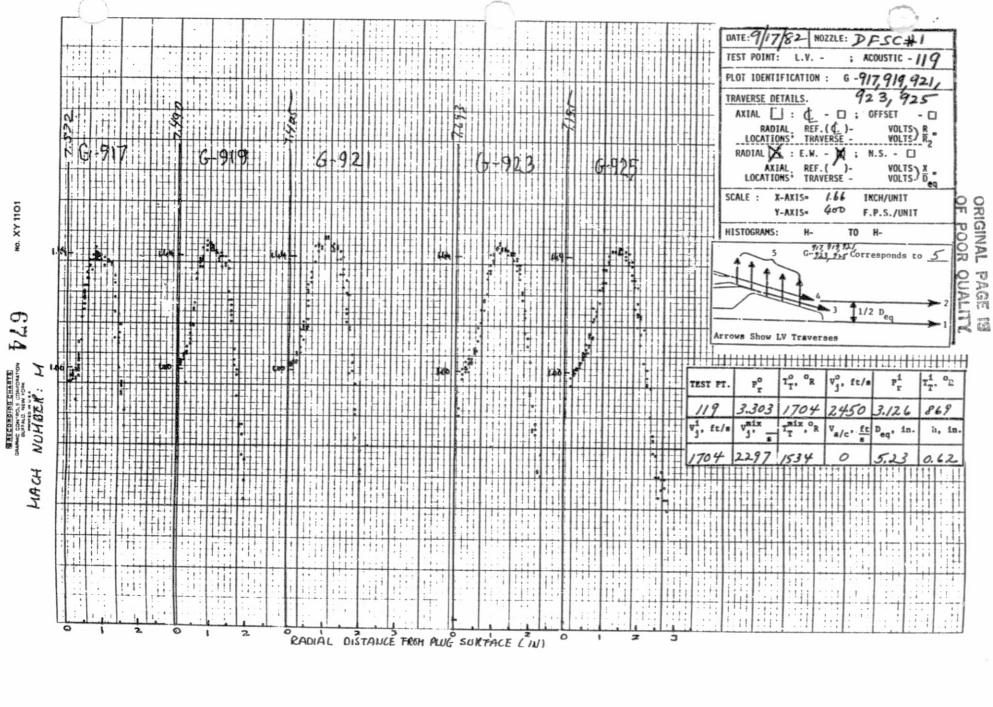
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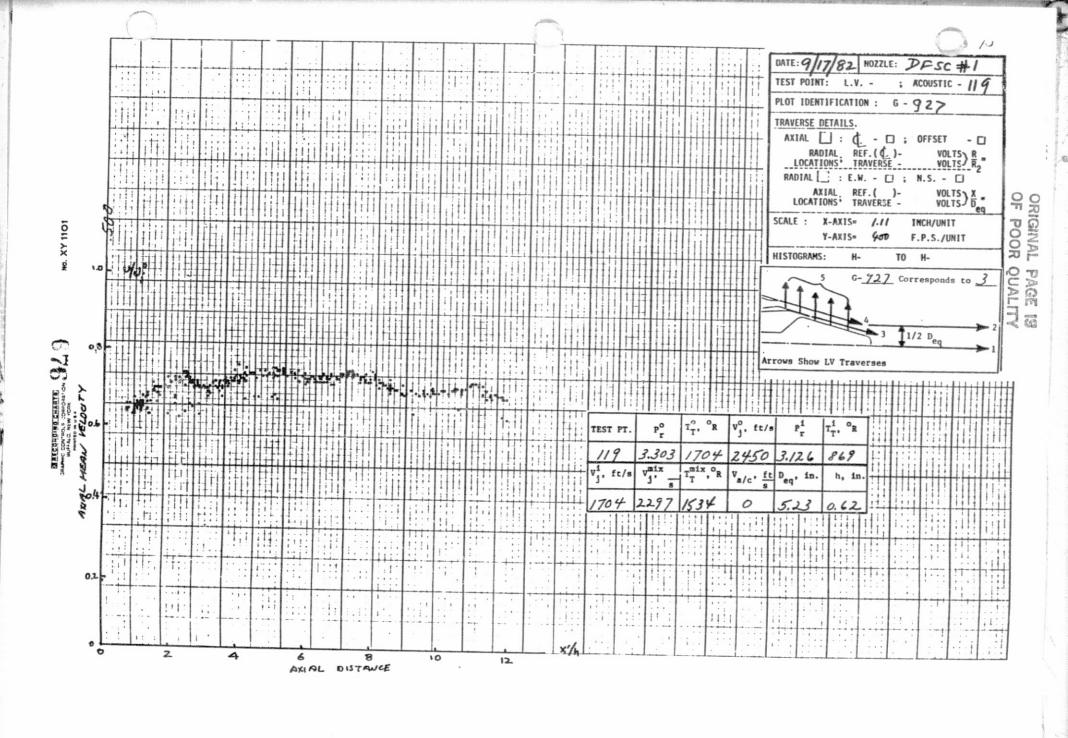


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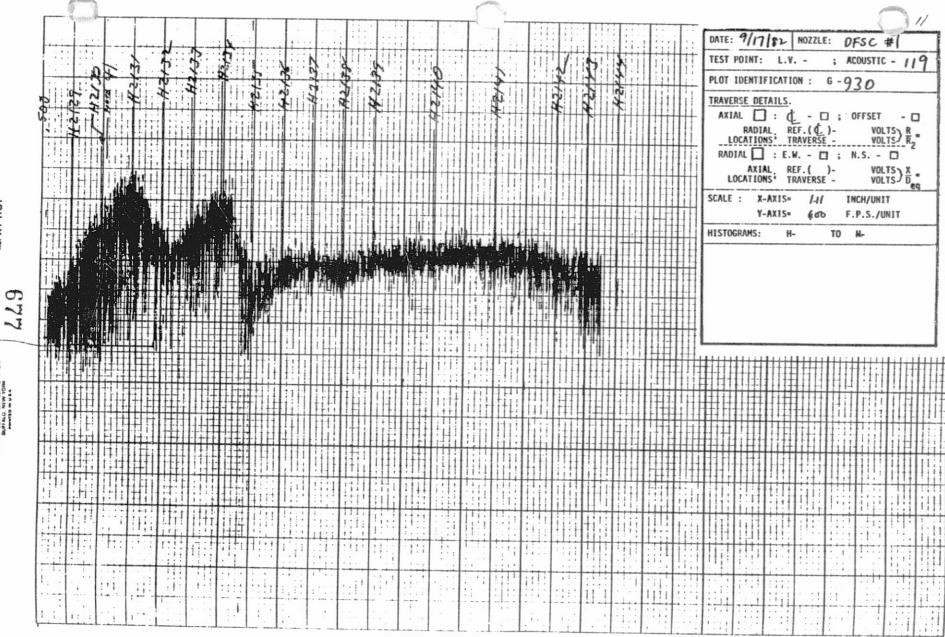
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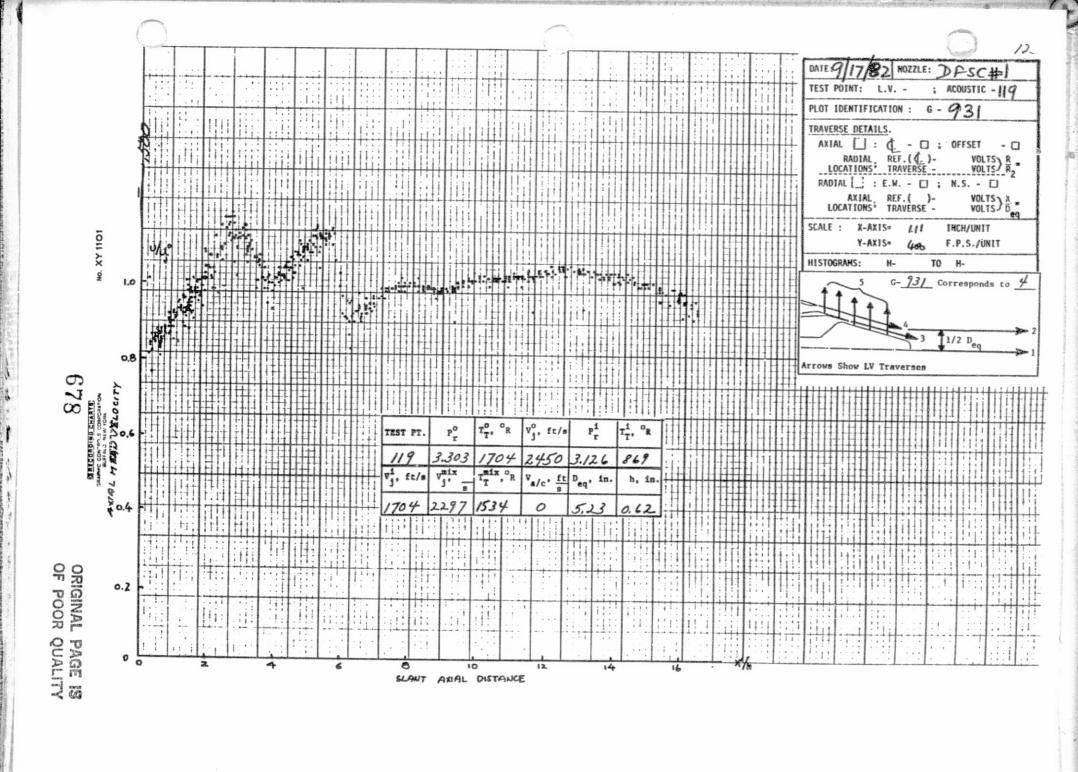


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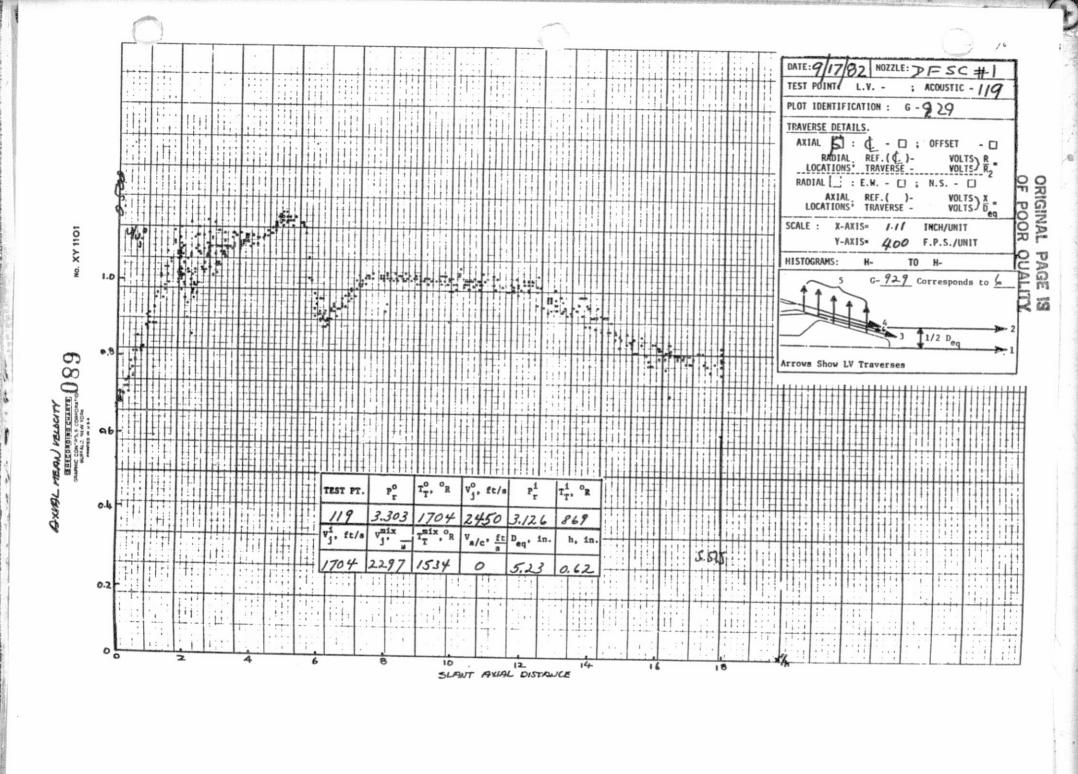


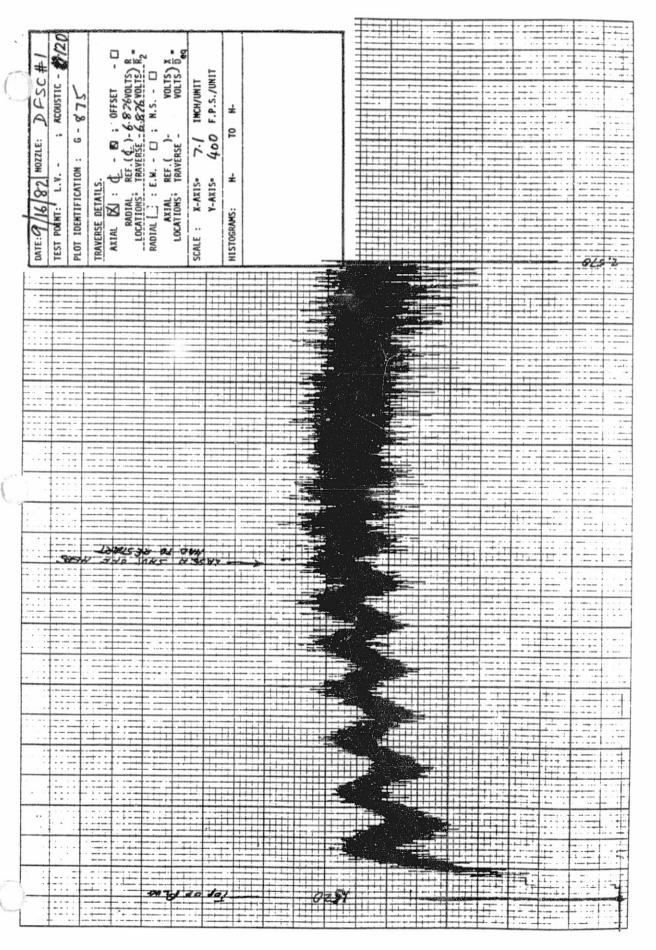


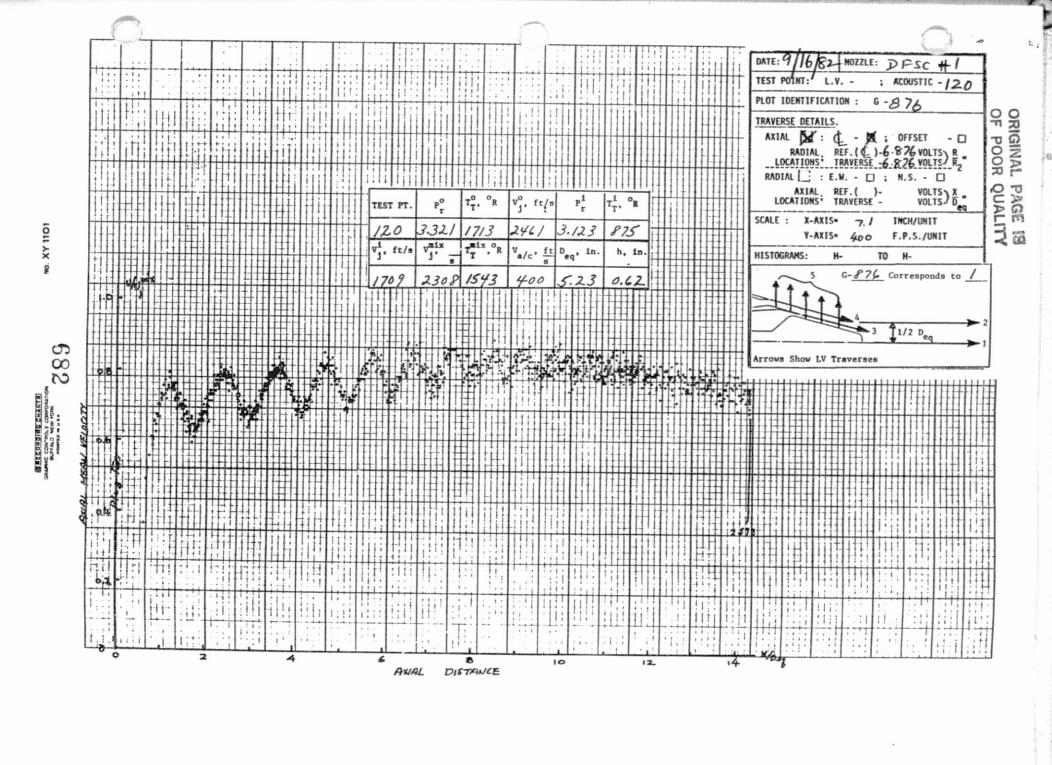
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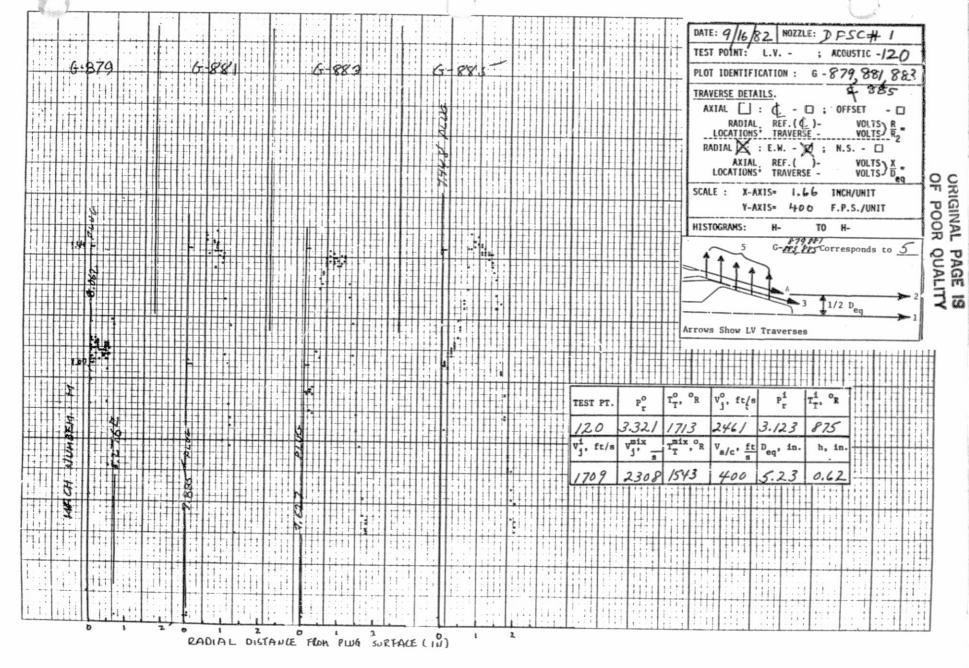


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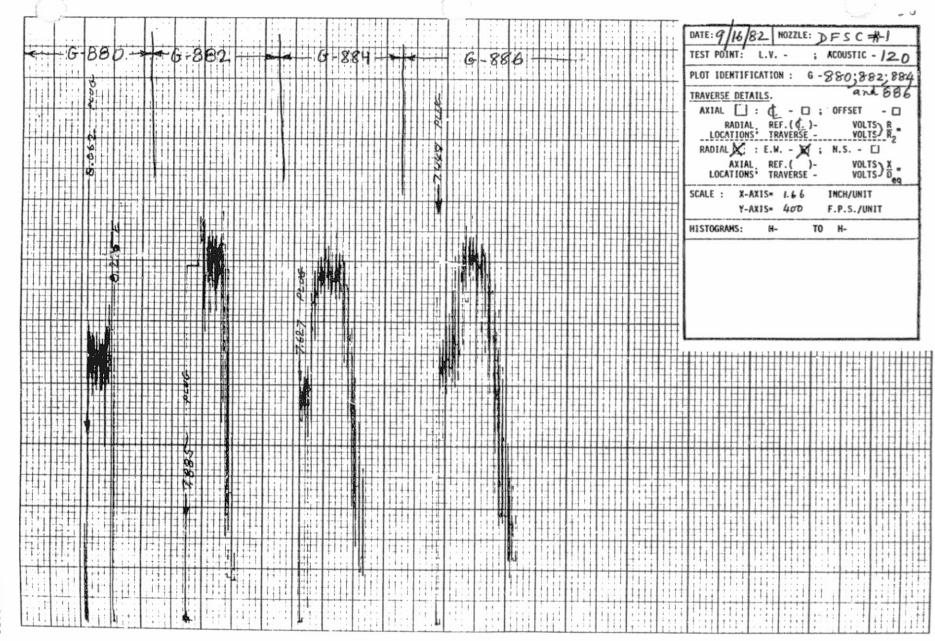
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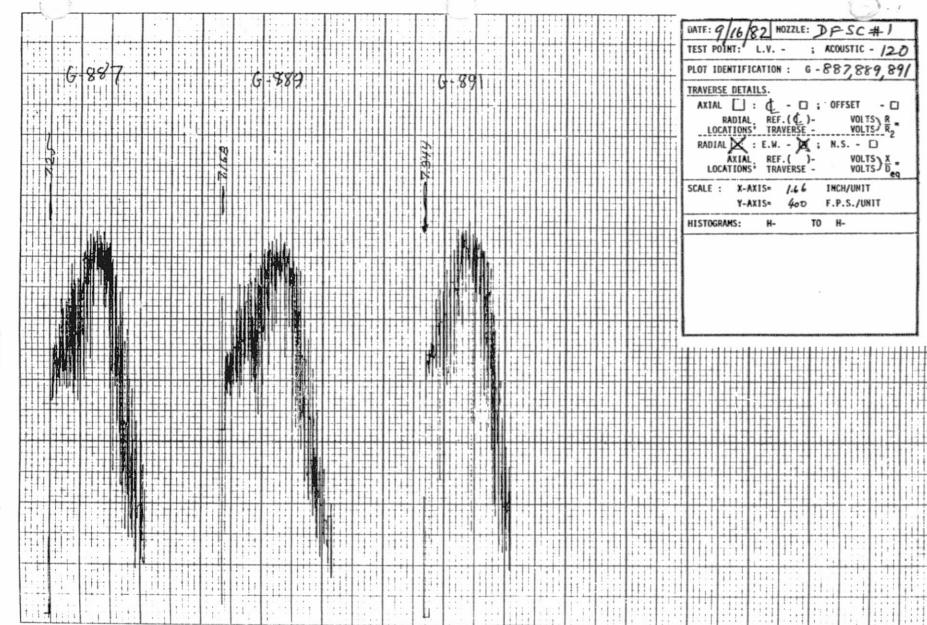
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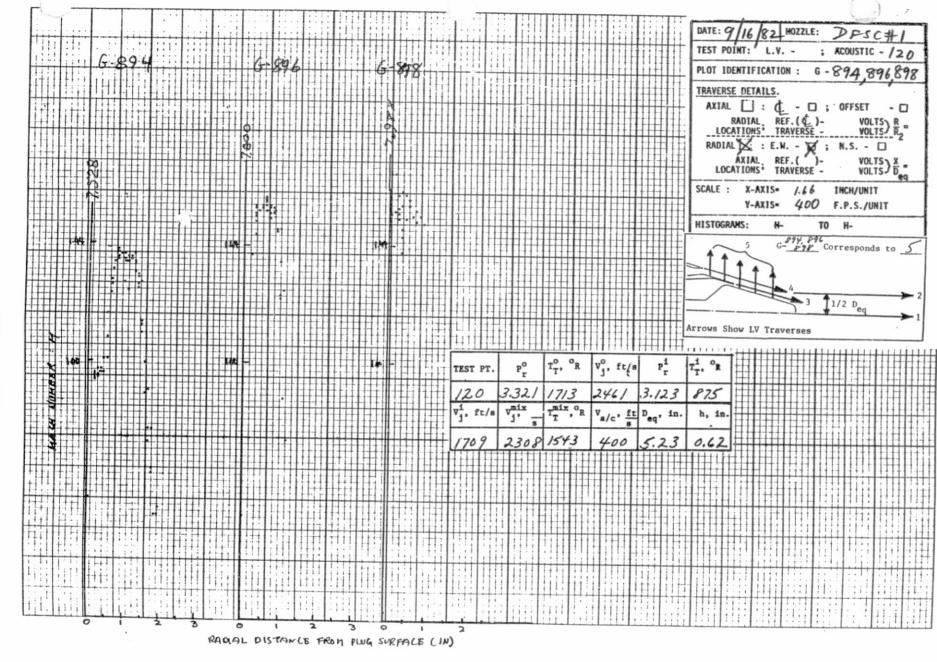
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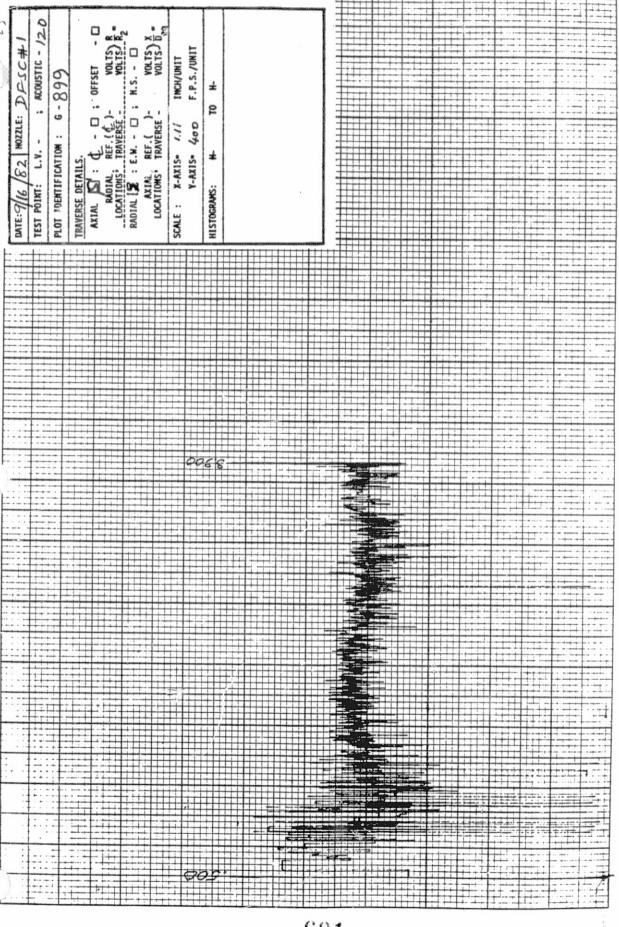
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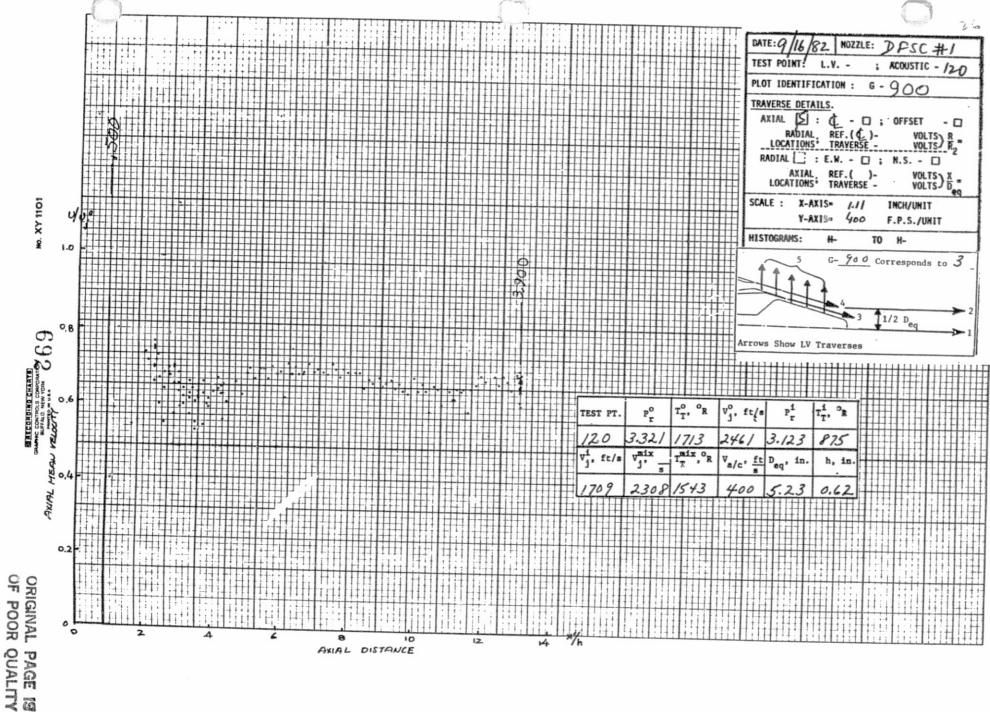


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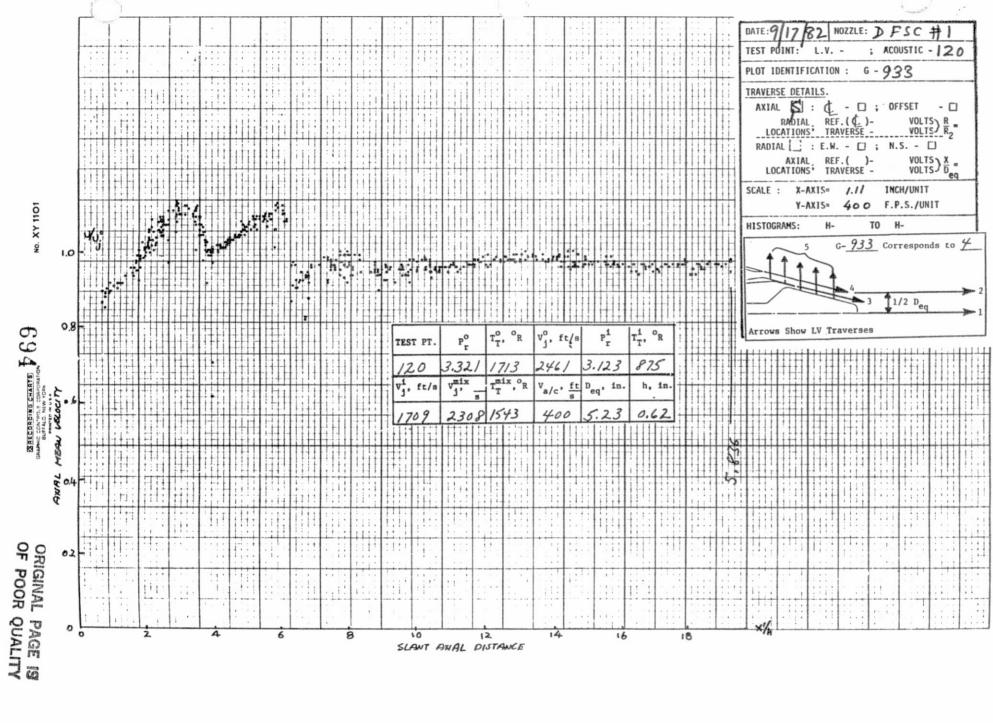
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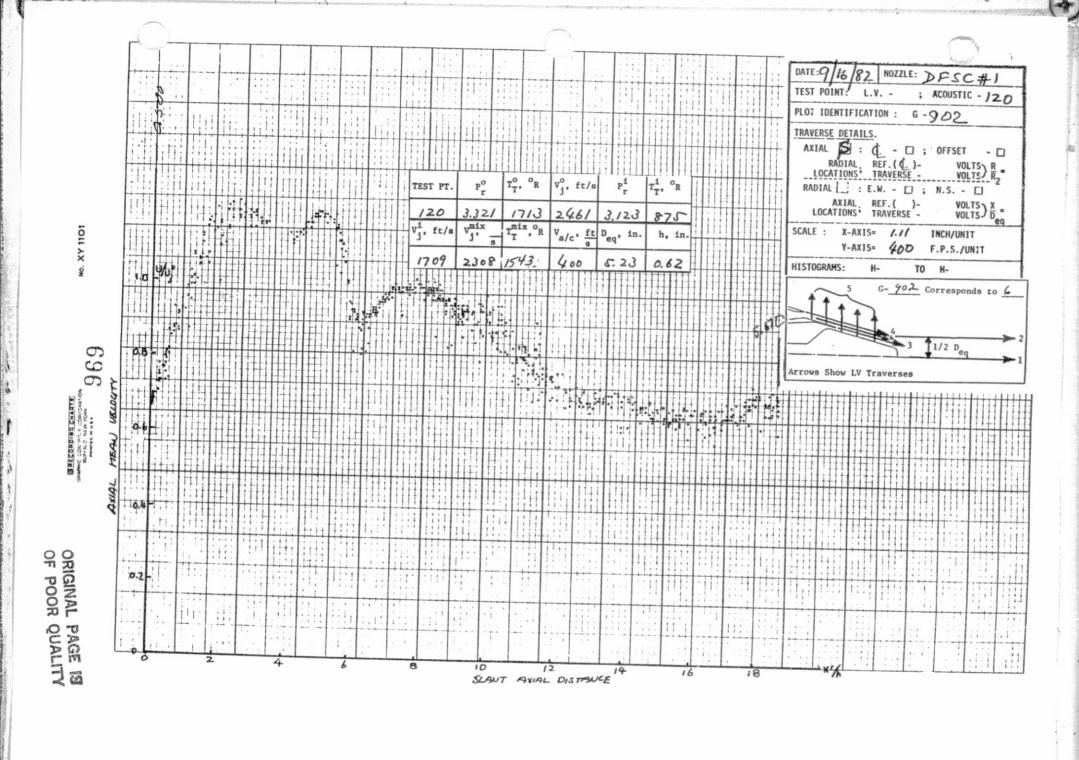
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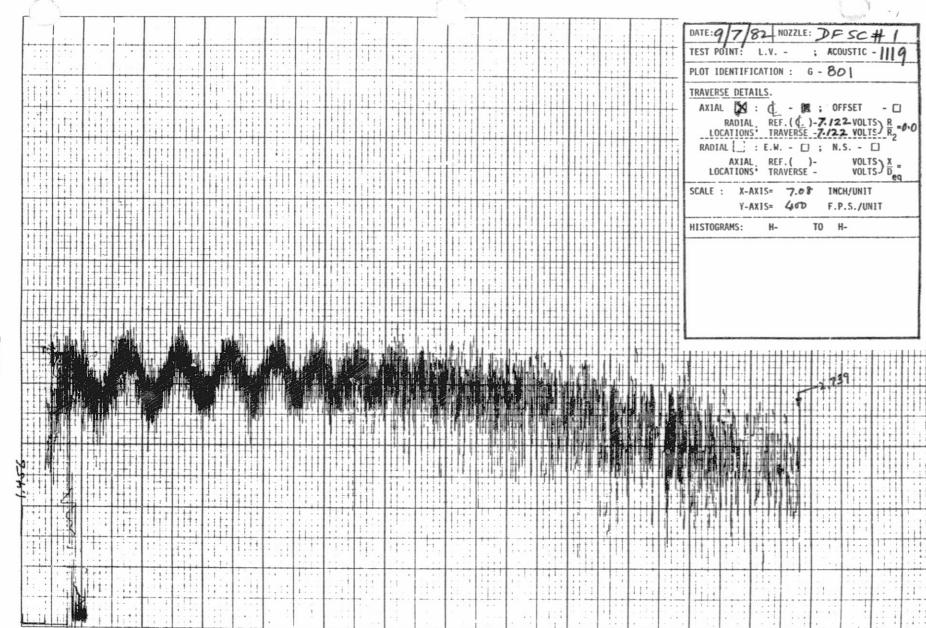
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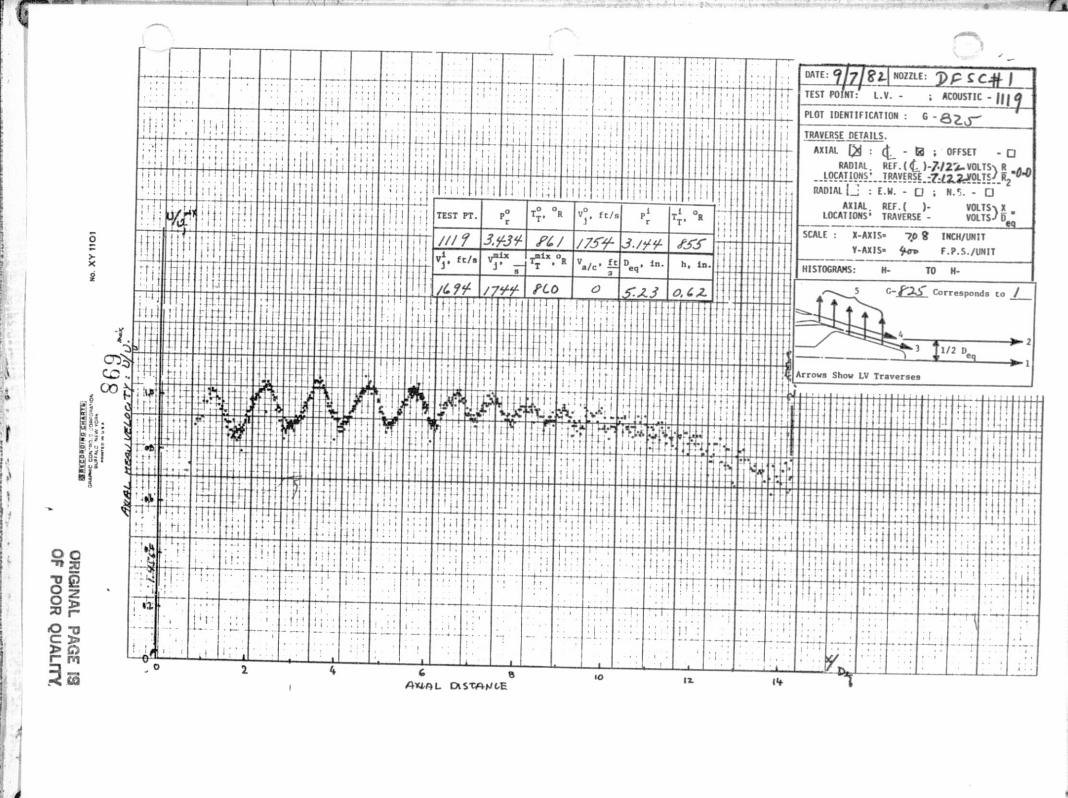
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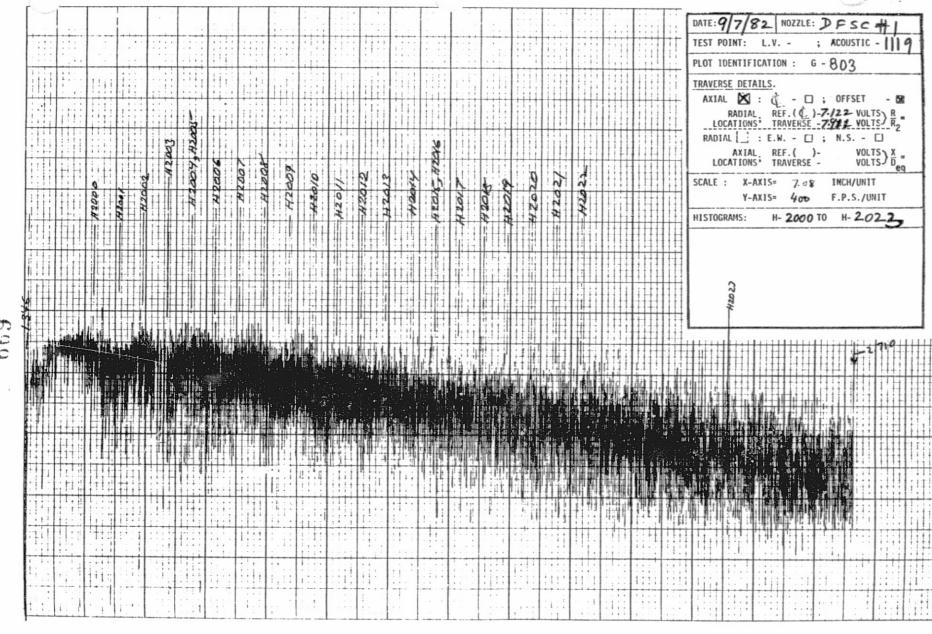
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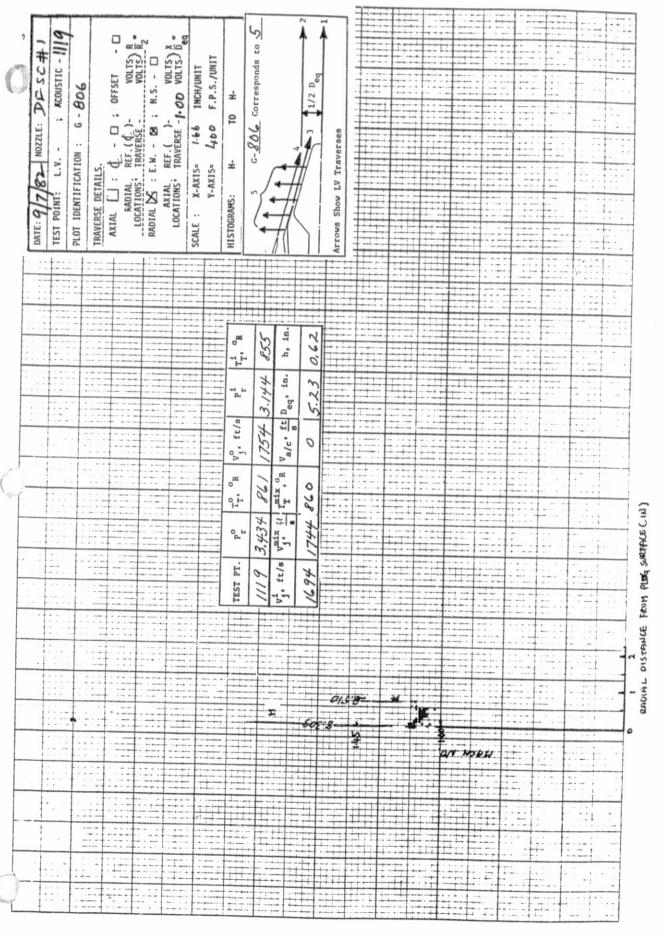
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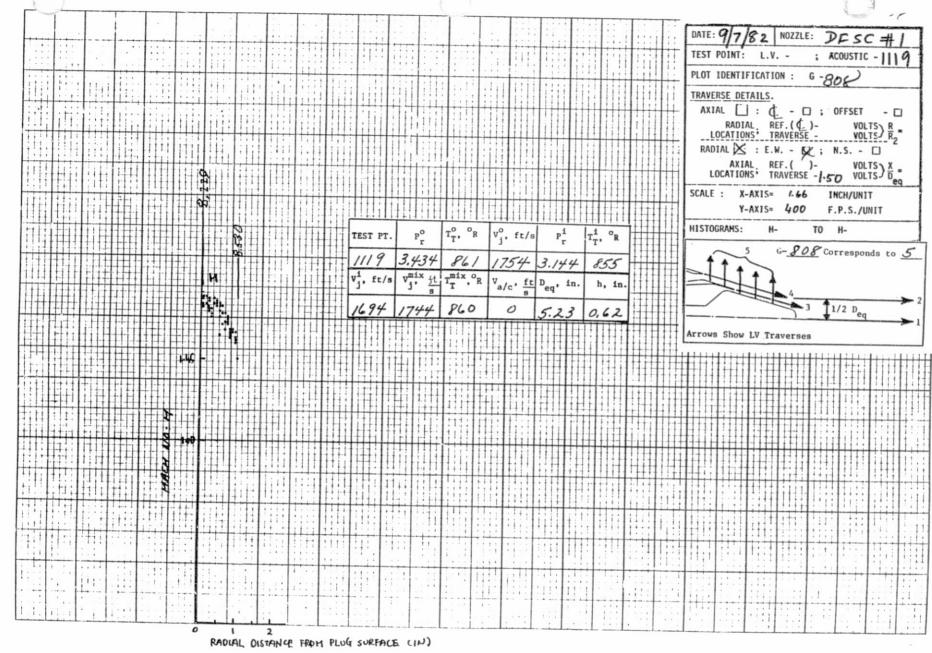
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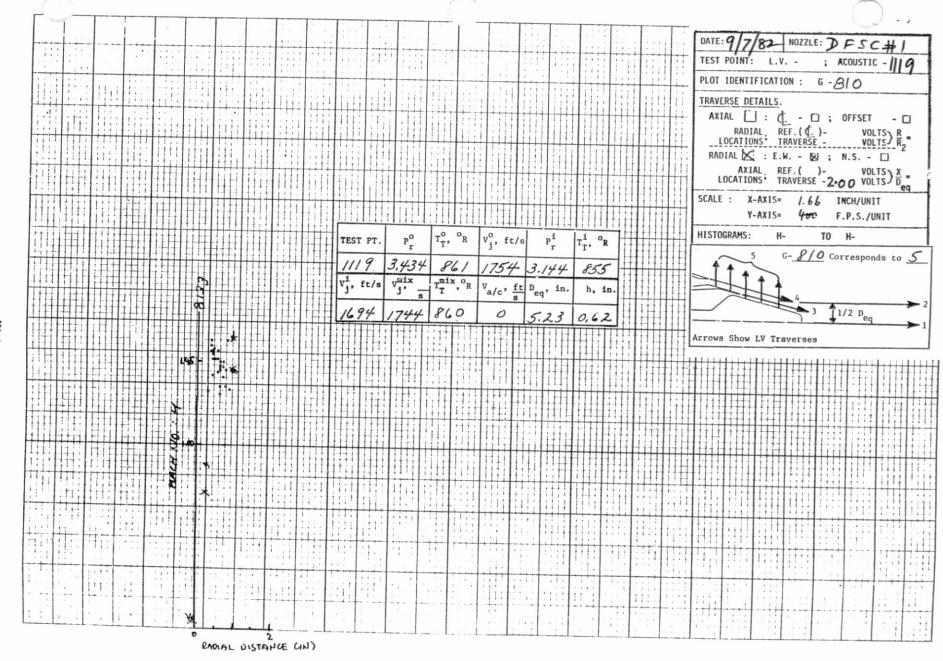
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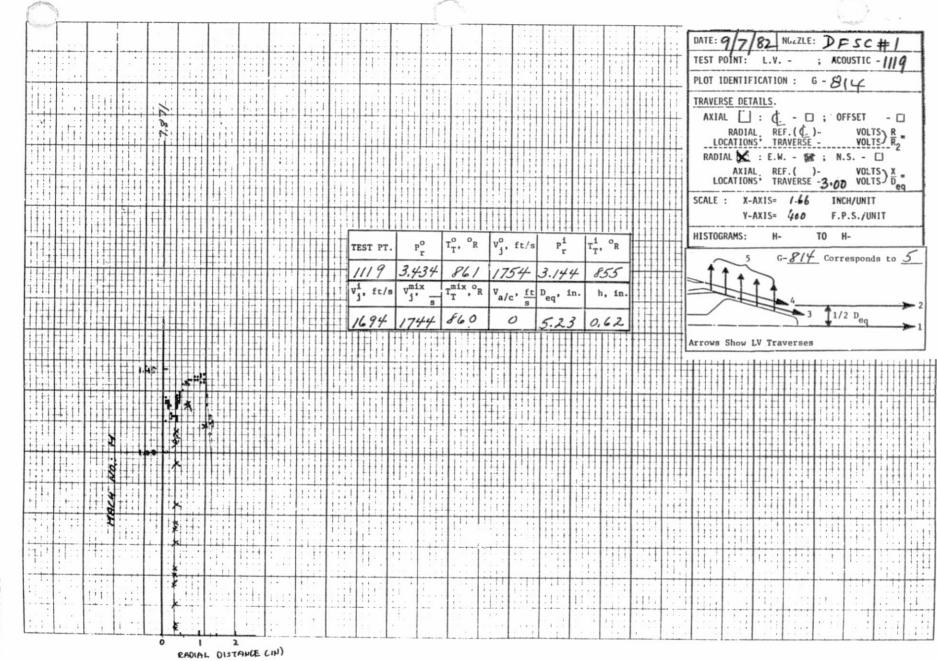
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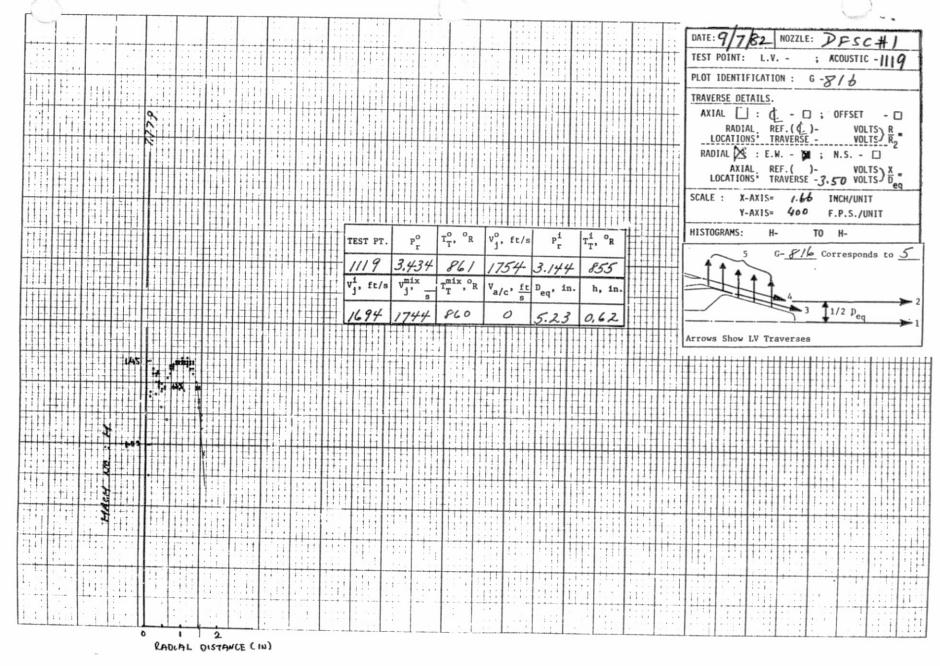
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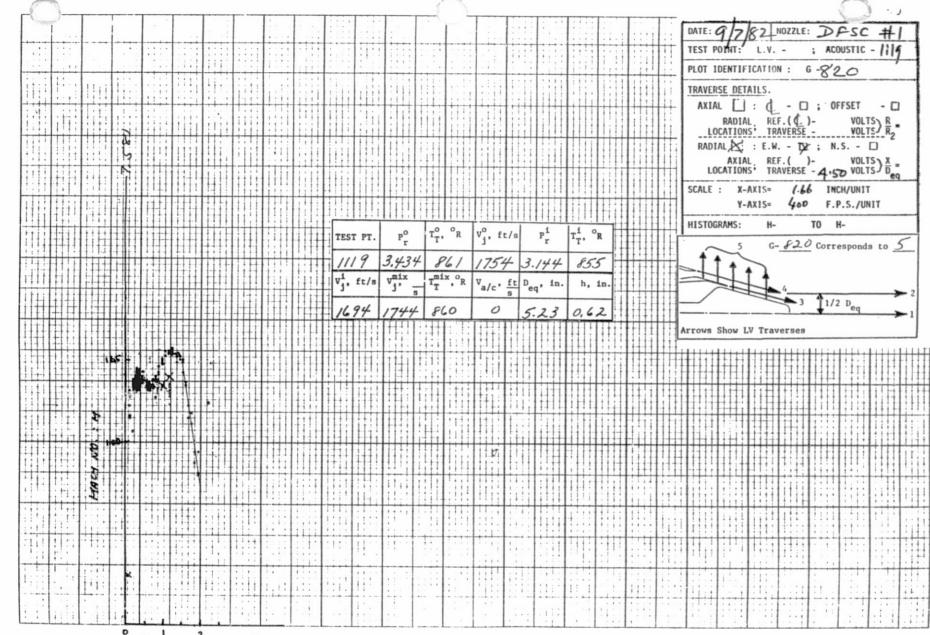
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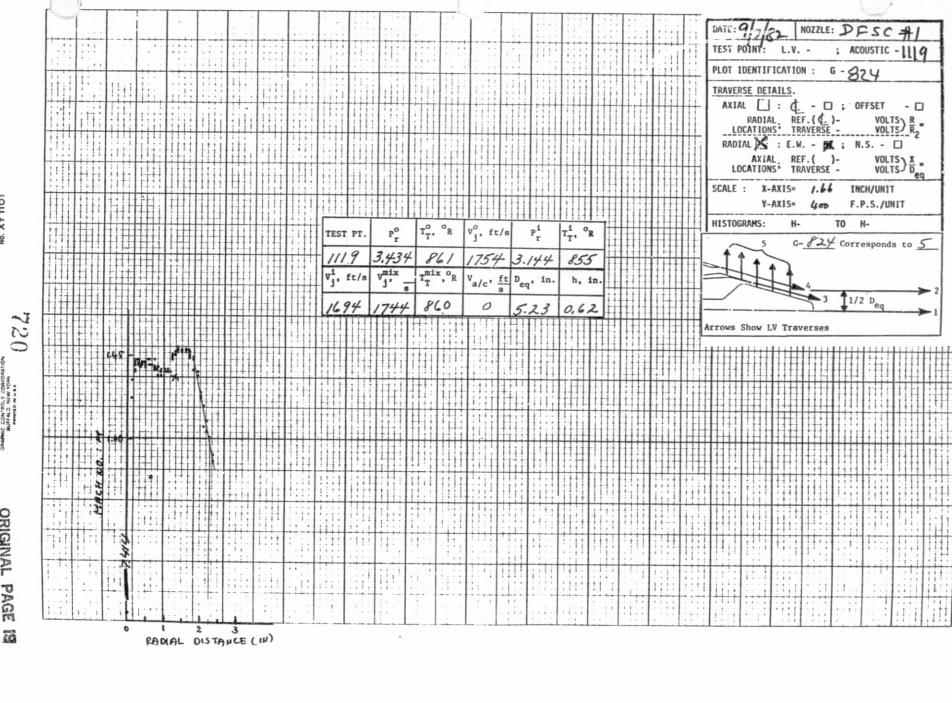
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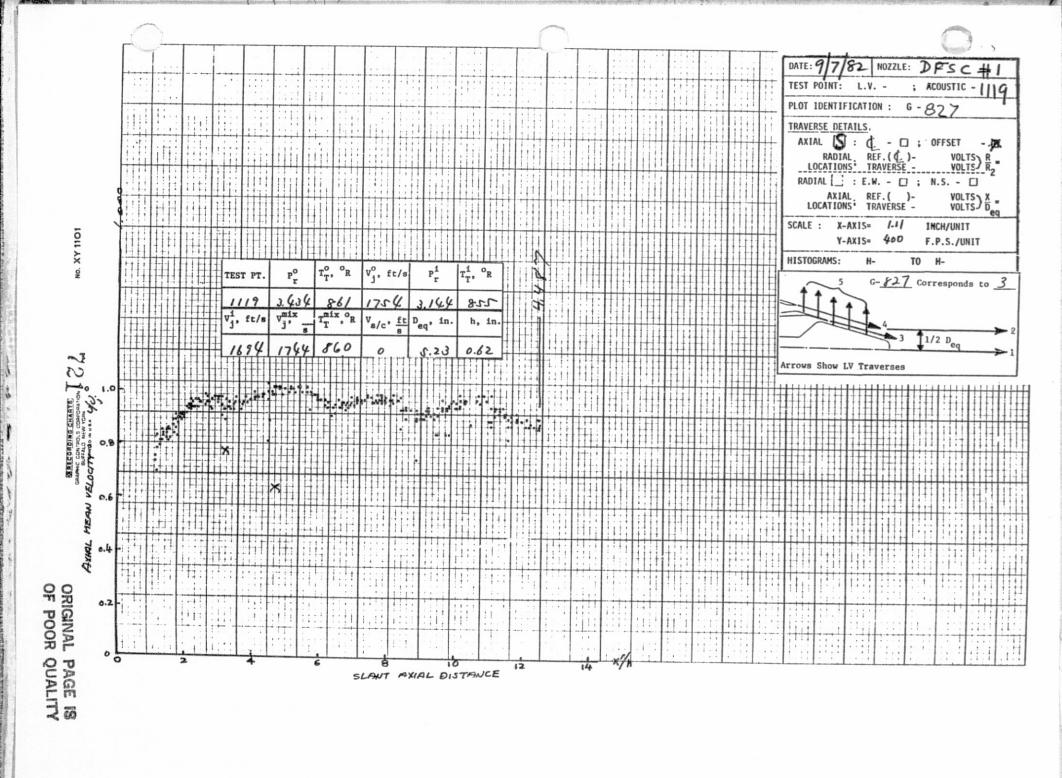
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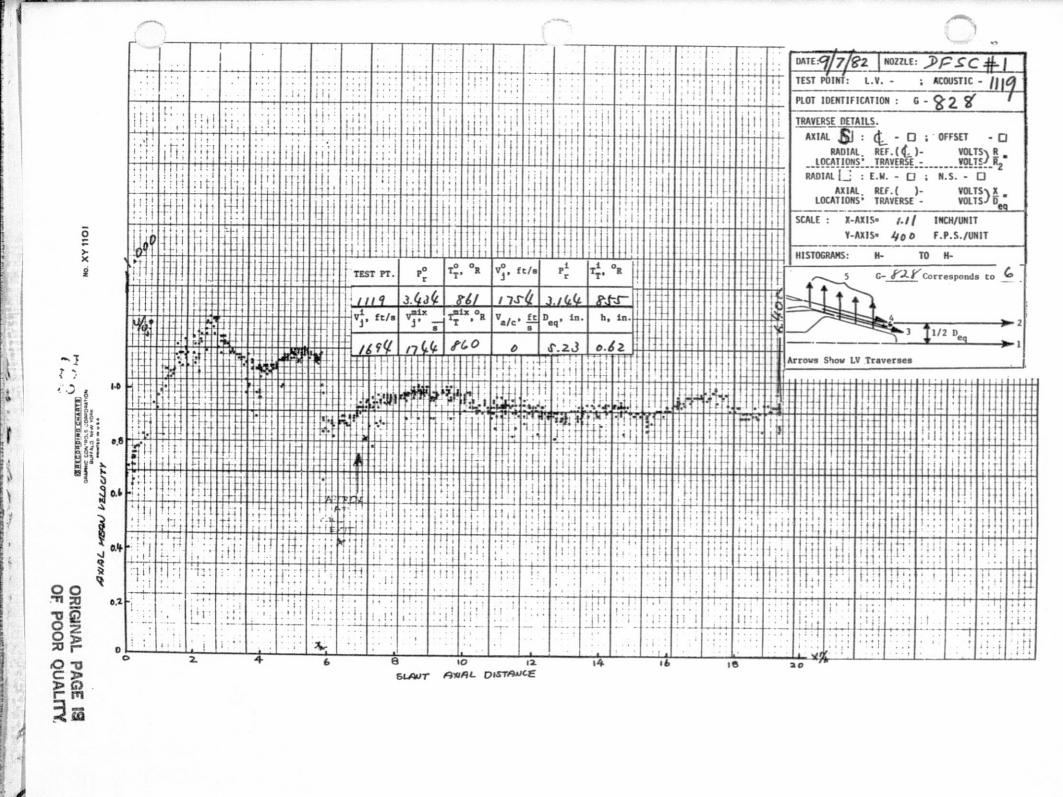
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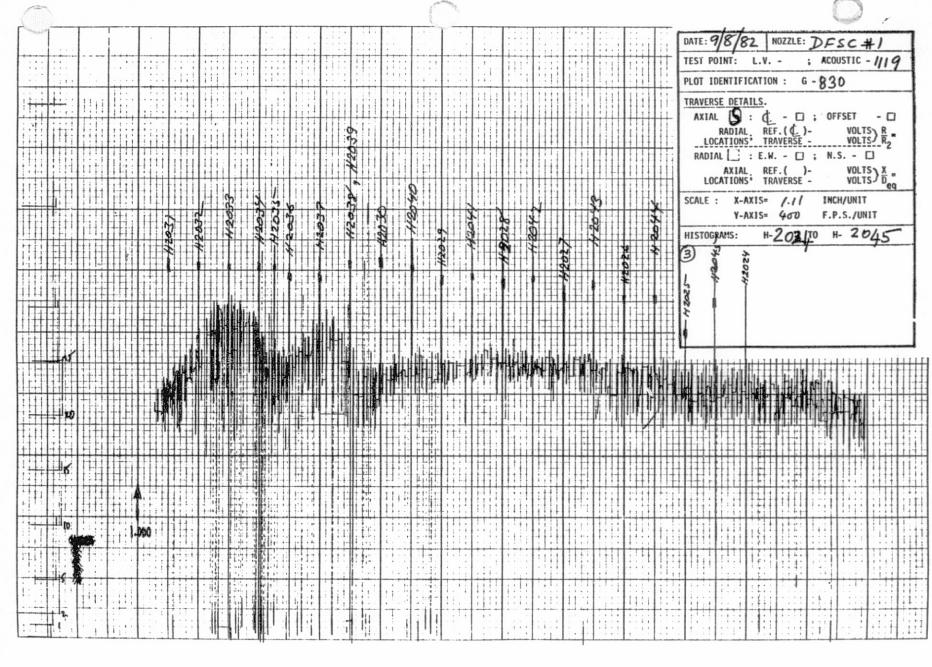
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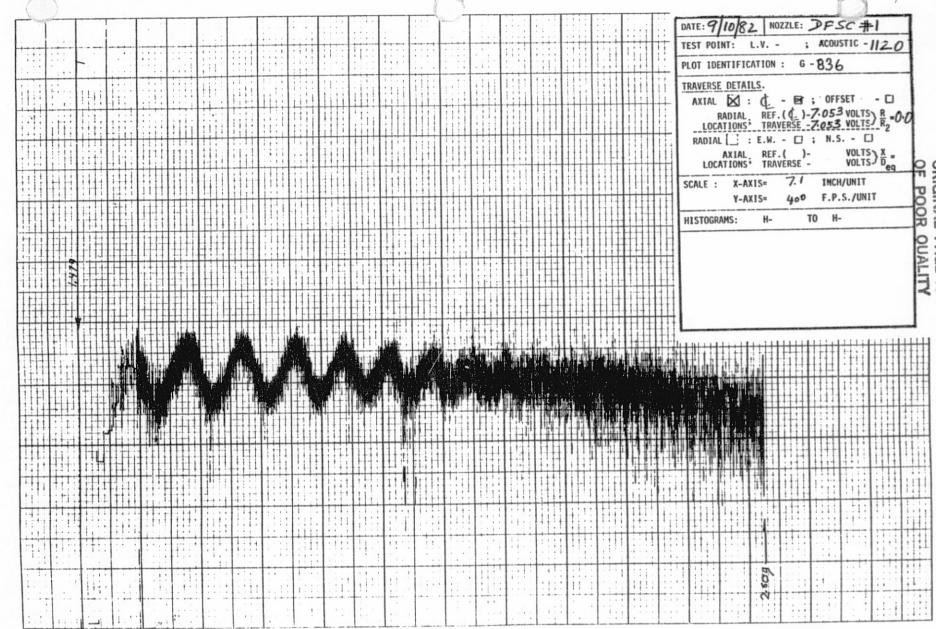
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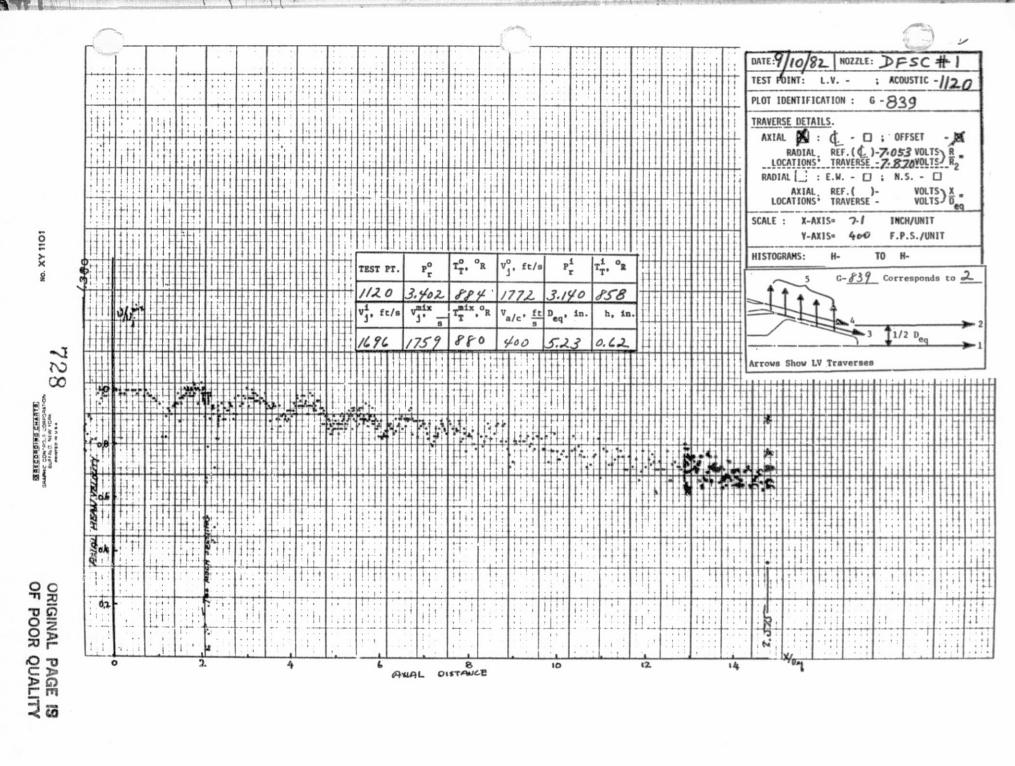
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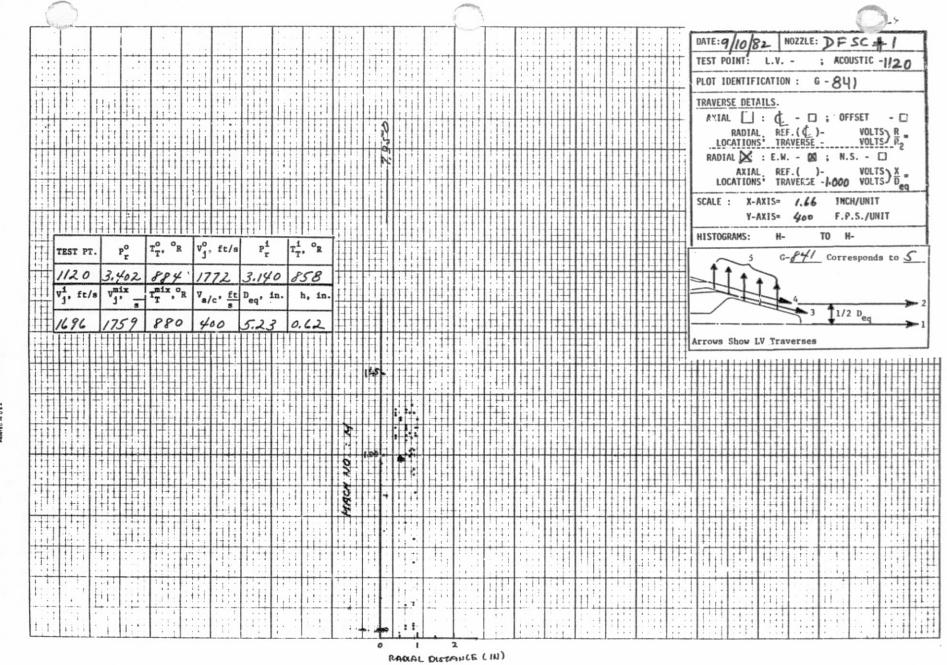
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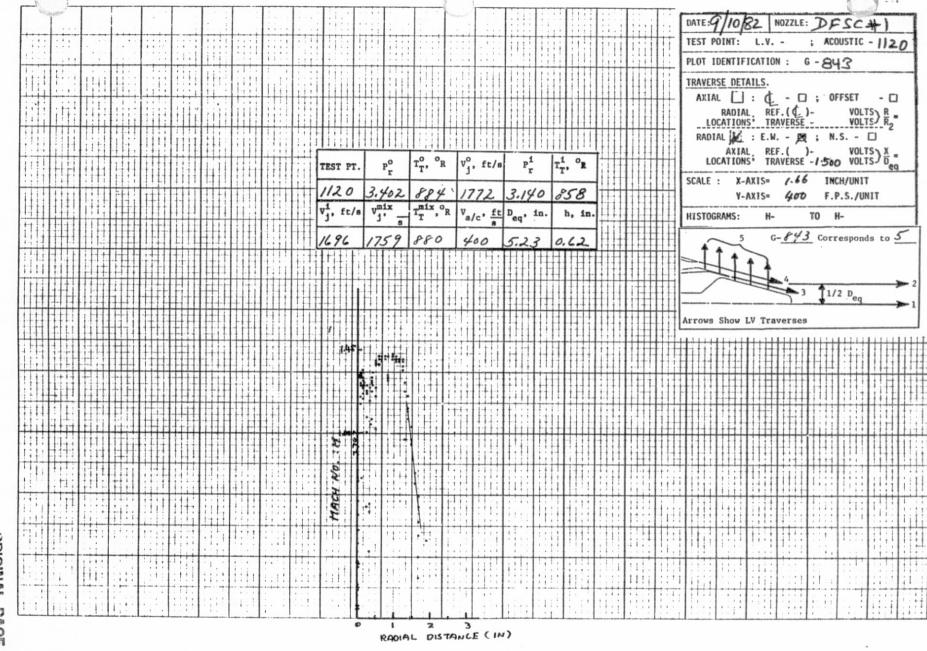
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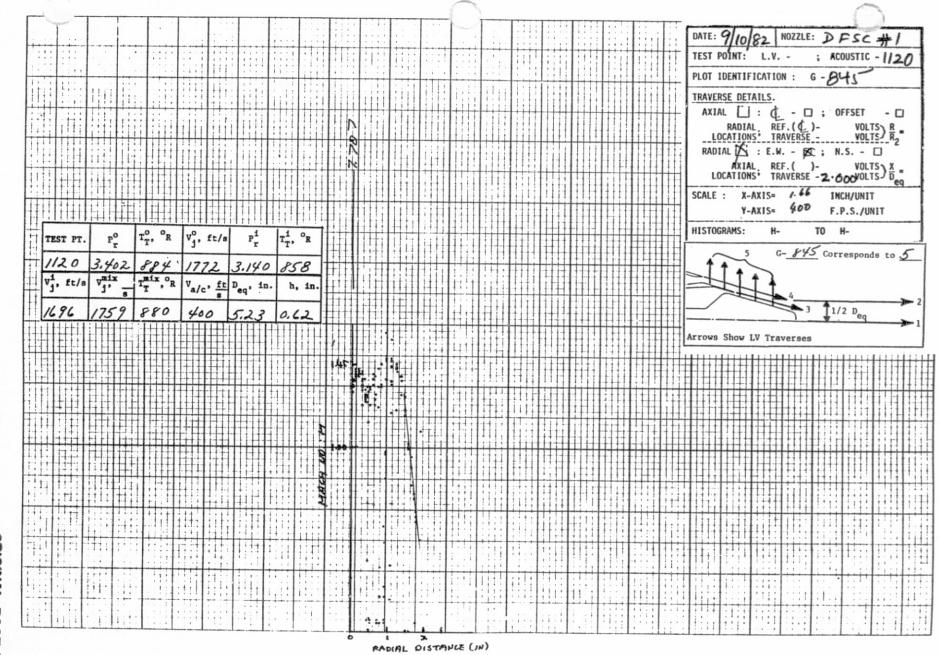
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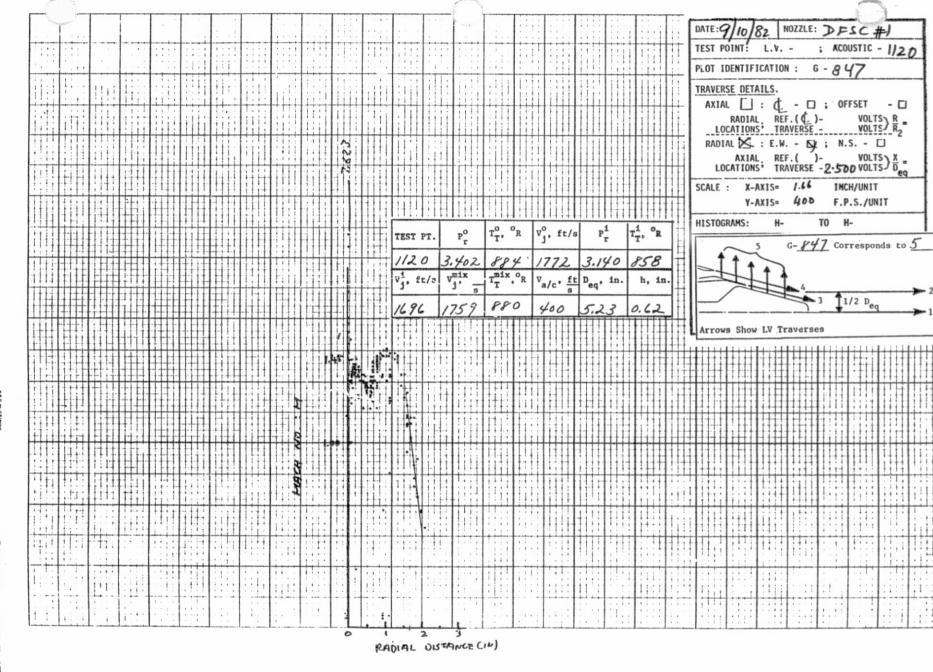
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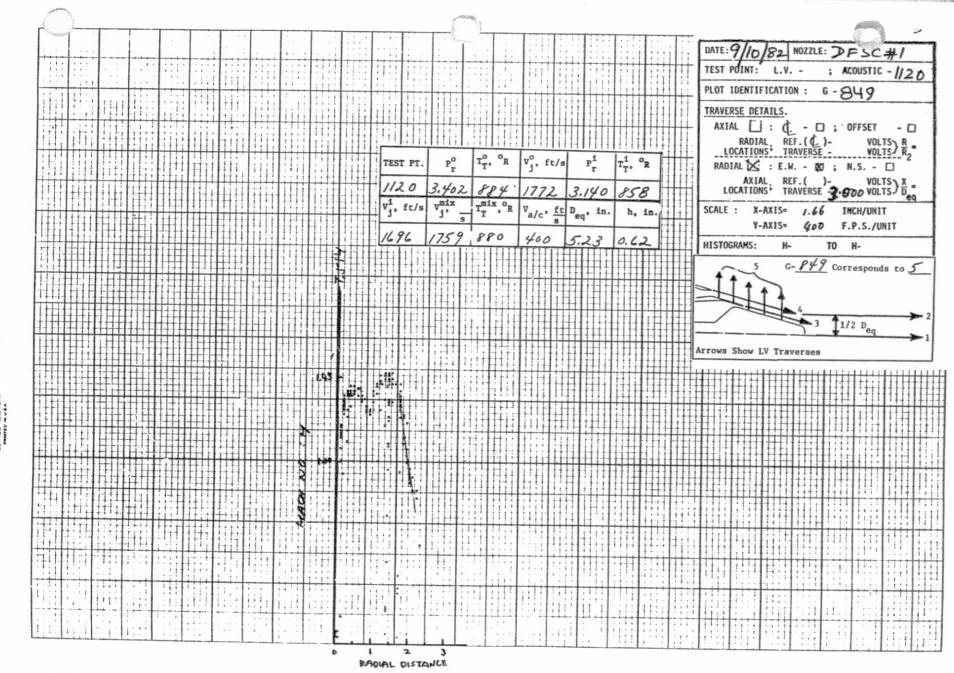


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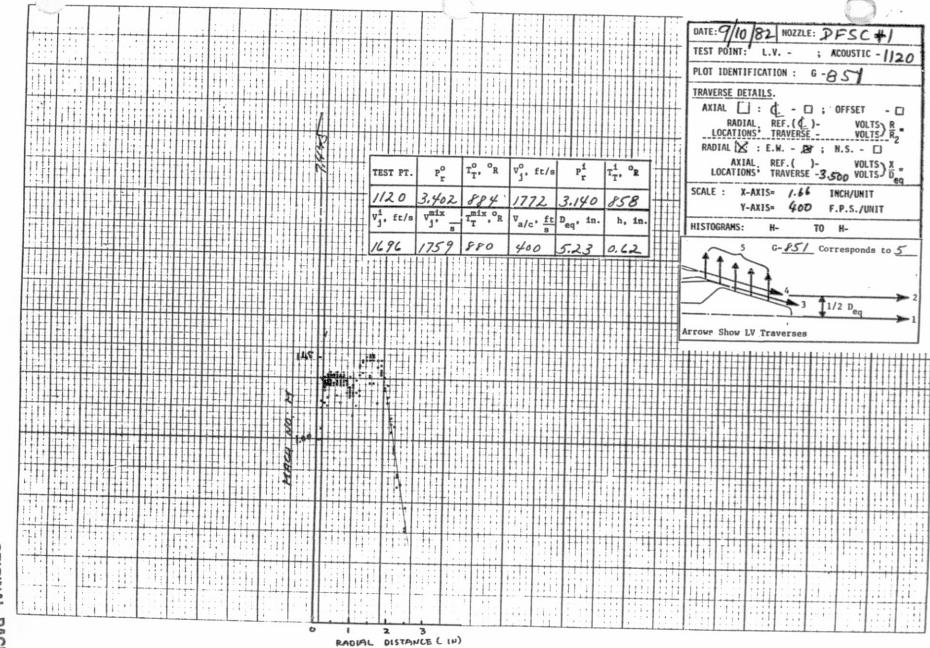


No. XY 1101

DATE-9/10/92 WOZZIE: DPSC #) TEST POINT: L.V ACOUSTIC - 1): PLOT IDENTIFICATION: G- BUY BY THANKES PETALLS. AXIAL L.: (L L.: OFFSET - 1): BRAILA, EF. (R.) WOLTS, B. LOCATIONS: TRAVESS: WOLTS, B. LOCATIONS: TRAVESS: - MOUTS, B. LOCATIONS: TRAVESS: - MOUTS, B. LOCATIONS: TRAVESS: - MOUTS, B. SCALE: A-AXIS - A64 INCHUNIT Y-AXIS - 400 F.S.S./MIT HISTOGRAMS: H- TO H-									 			 1	'n										3
PROT IDENTIFICATION: G - 8-1-8 TRAVERSE DETAILS: ANIAL L. C. OUTS SET AND IN REF. (- VOLTS N. ANIAL L. C. OUTS N. ANIAL L. C. OUTS N. ANIAL L. C. OUTS N. ANIAL L. C. OUTS N. ANIAL M. REF. (- VOLTS N. ANIAL M. REF. (- VOLTS N. CONTIONS: TRAVERSE OO VOLTS N. CONTIONS: TRAVERSE OO VOLTS N. ANIAL M. REF. (- VOLTS N. CONTIONS: TRAVERSE OO VOLTS N. ANIAL M. REF. (- VOLTS N. CONTIONS: TRAVERSE OO VOLTS N. CONTIONS: TRAVERSE OO VOLTS N. ANIAL M. REF. (- VOLTS N. CONTIONS: TRAVERSE OO VOLTS N. CONTIONS: TRAVERSE OO VOLTS N. ANIAL M. REF. (- VOLTS N. ANIAL M. REF					1							************					DATE:	9/10	82	NOZZLE	:DF	SC:	#)
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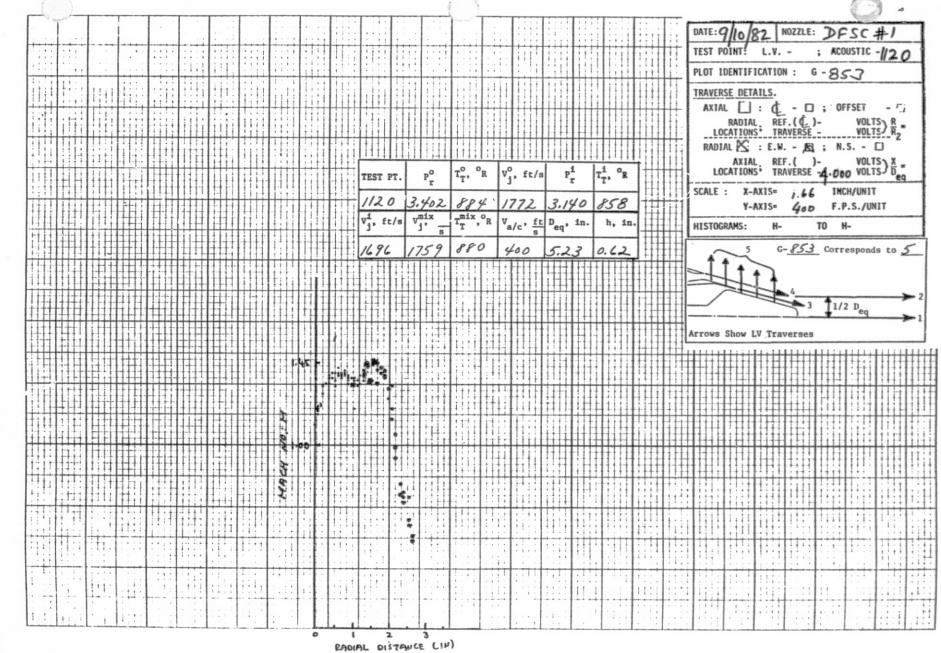
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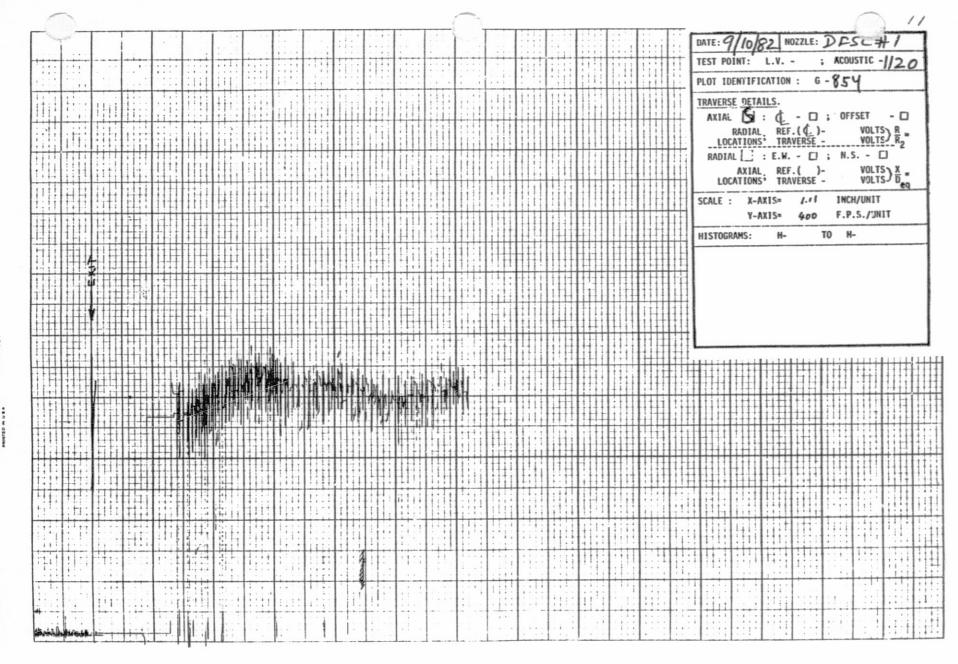


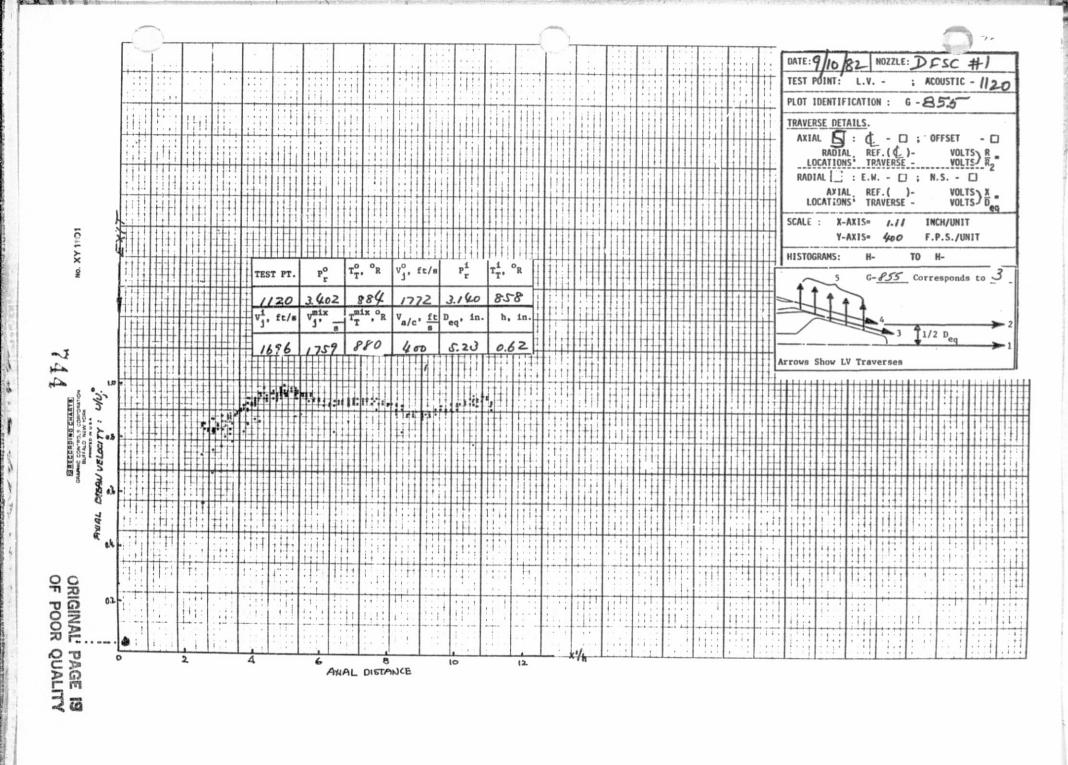
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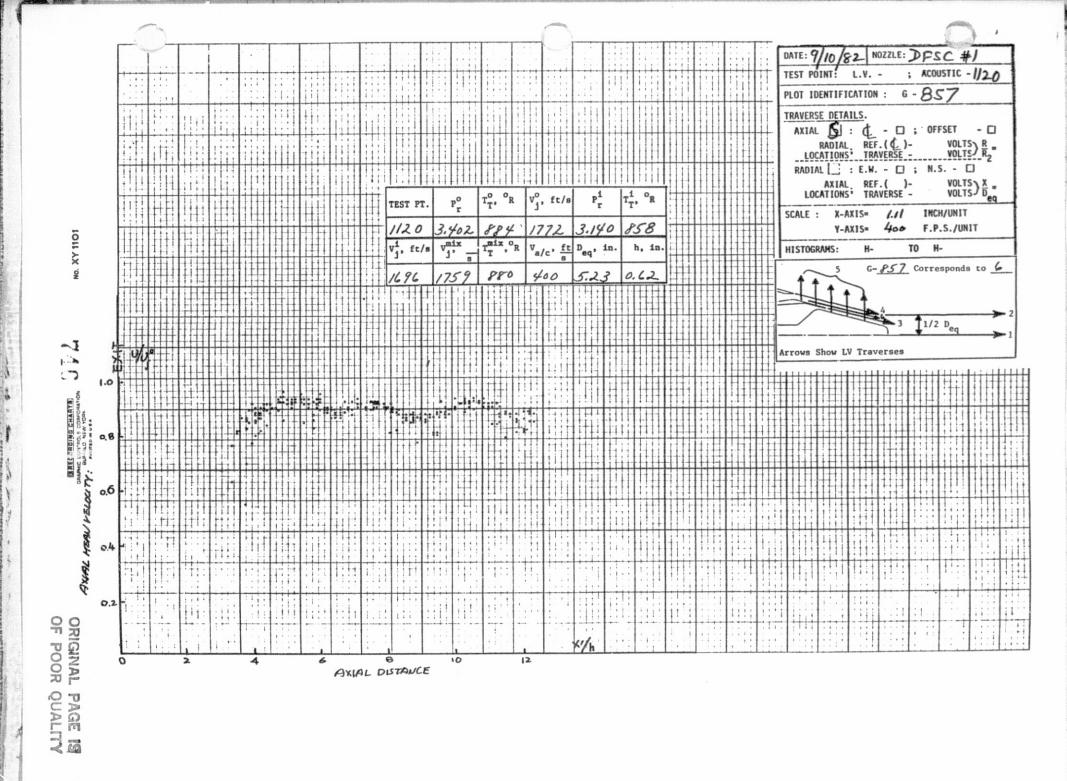
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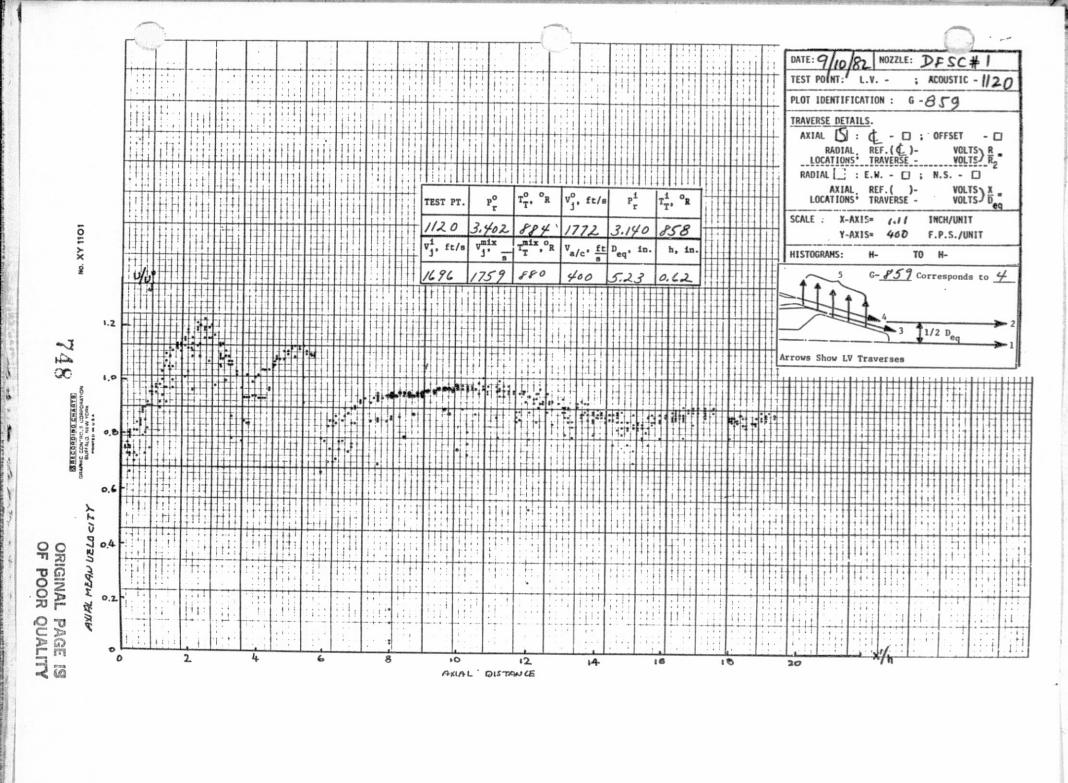


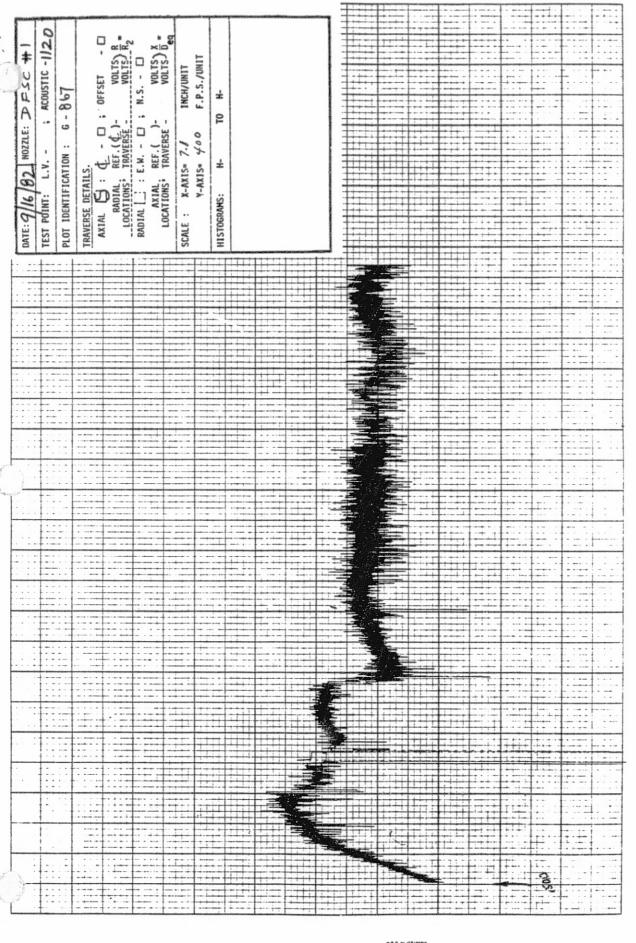


DATE: 9/10/82 NOZZLE: DESC # 1 ; ACOUSTIC -1/20 TEST POINT: L.V. -PLOT IDENTIFICATION : G-856 TRAVERSE DETAILS. RADIAL REF. () - VOLTS R VOLTS R RADIAL S: E.M. - ; N.S. - ; VOLTS) X -AXIAL REF.()-LOCATIONS TRAVERSE -/.// INCH/UNIT SCALE : X-AXIS= F.P.S./UNIT Y-AXIS= 400 TO H-HISTOGRAMS: Hi



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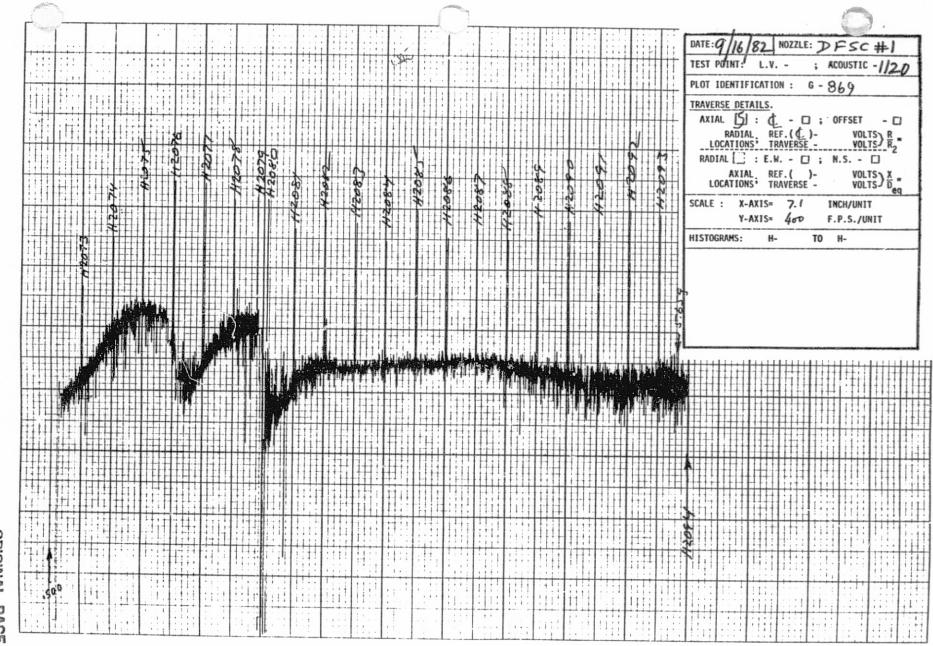


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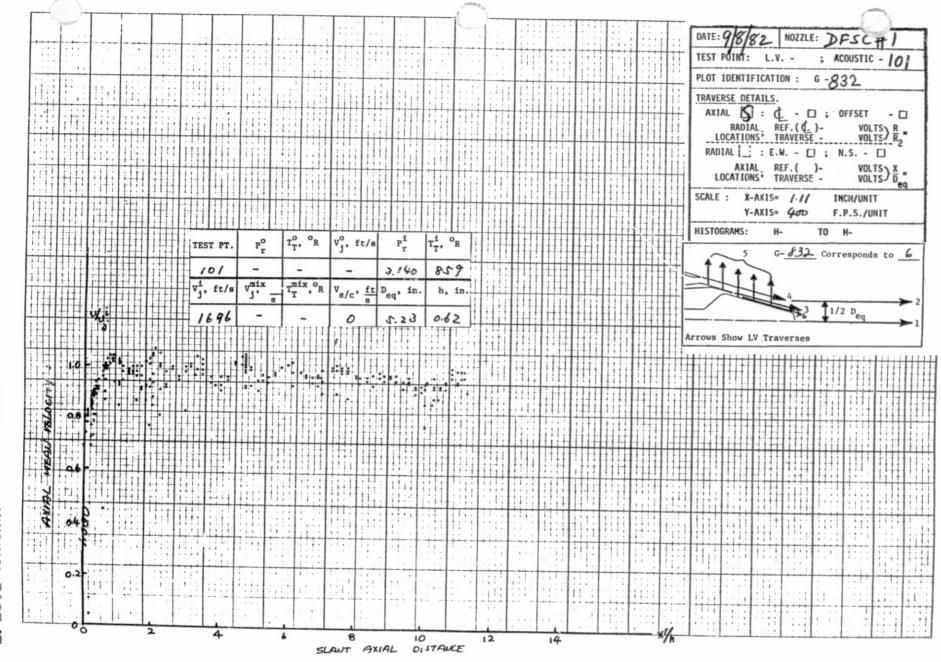


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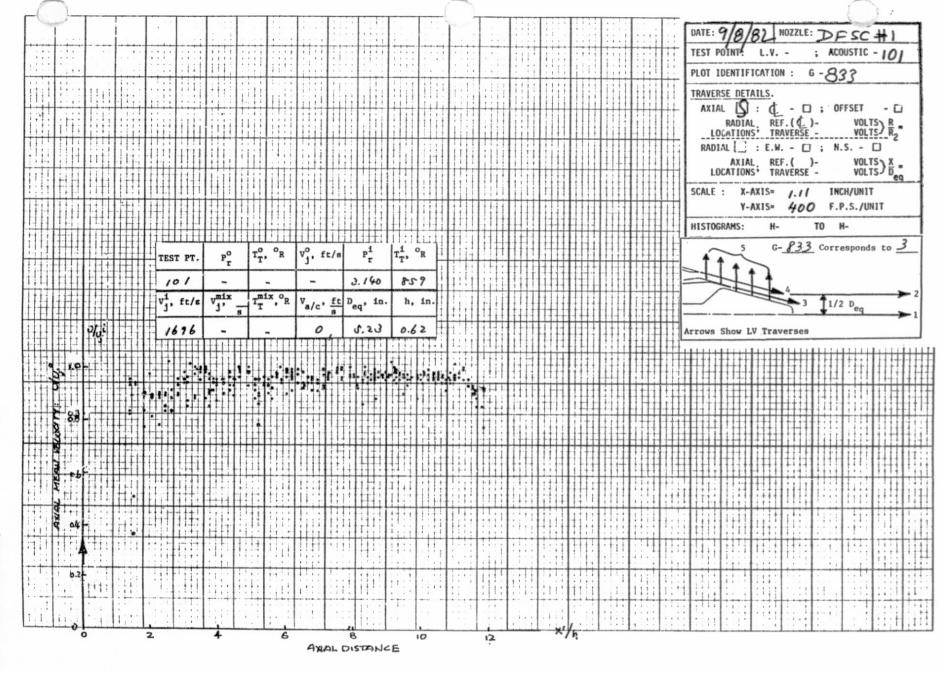
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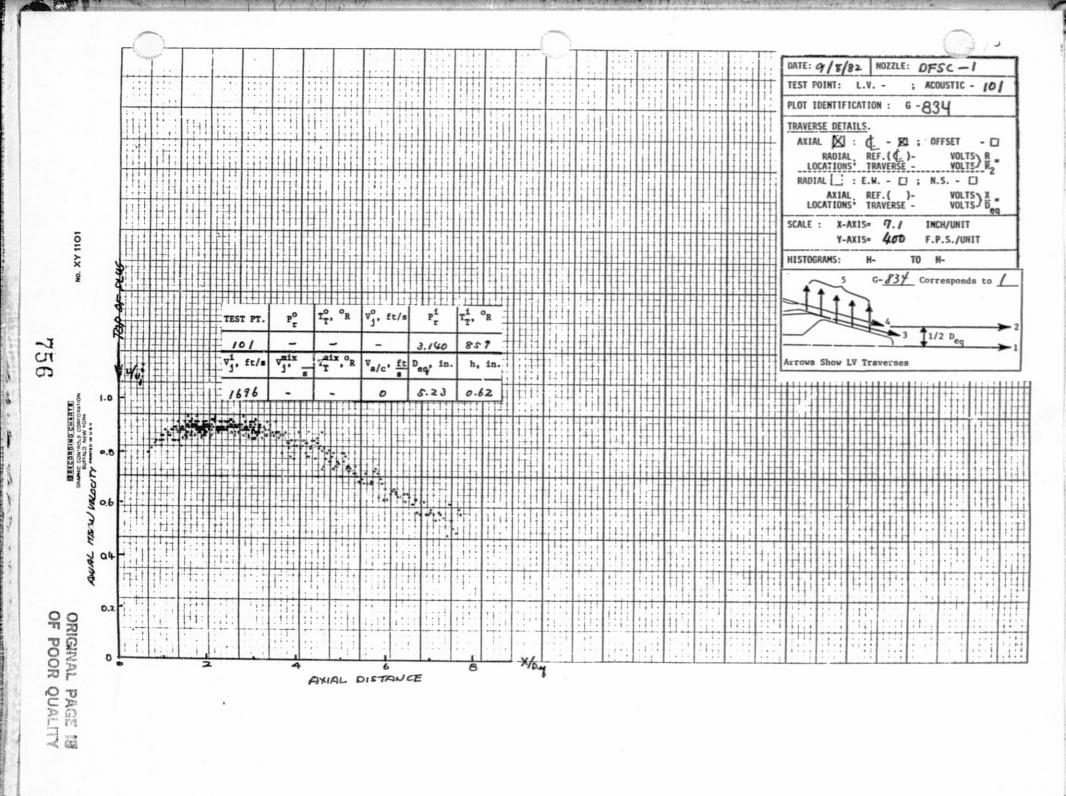
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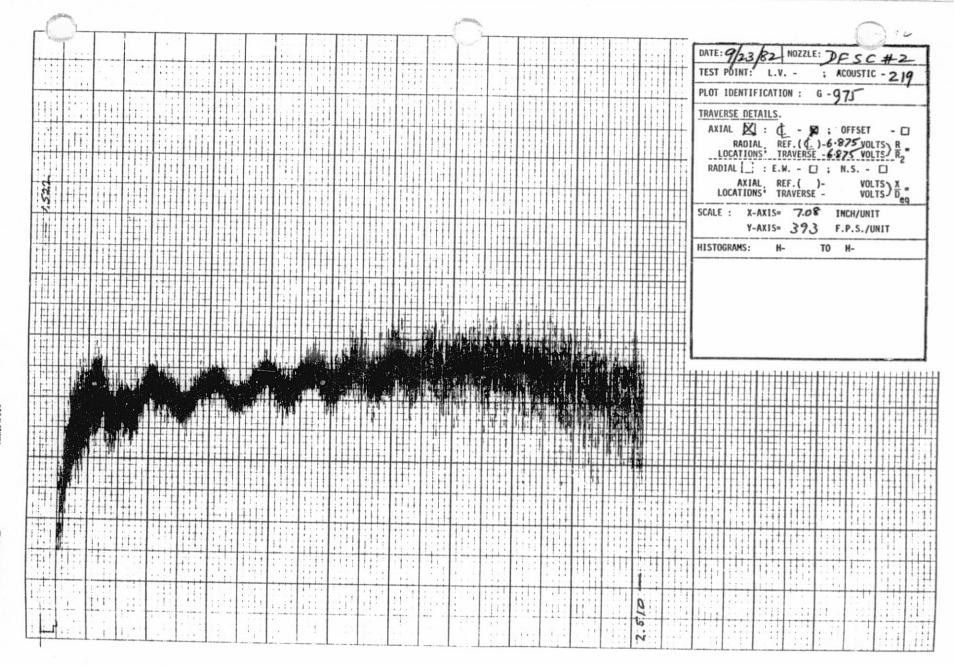
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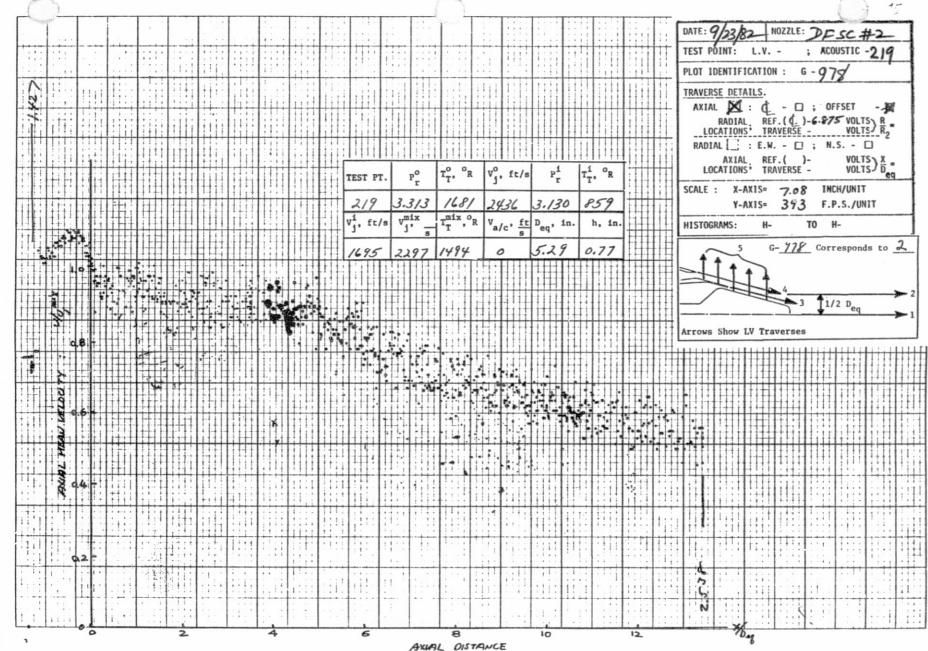
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GRASHEC CONTROL CORPORATION
BERFALL NEW YORK
SHORTED IN U.S.A.

NOZZLE: DFSC #2 ; ACOUSTIC - 219 TEST POINT: L.V. -2/2 1221 H2205 H 2200 G-977 HRROY PLOT IDENTIFICATION : TRAVERSE DETAILS. AXIAL X : Q - D ; OFFSET - X

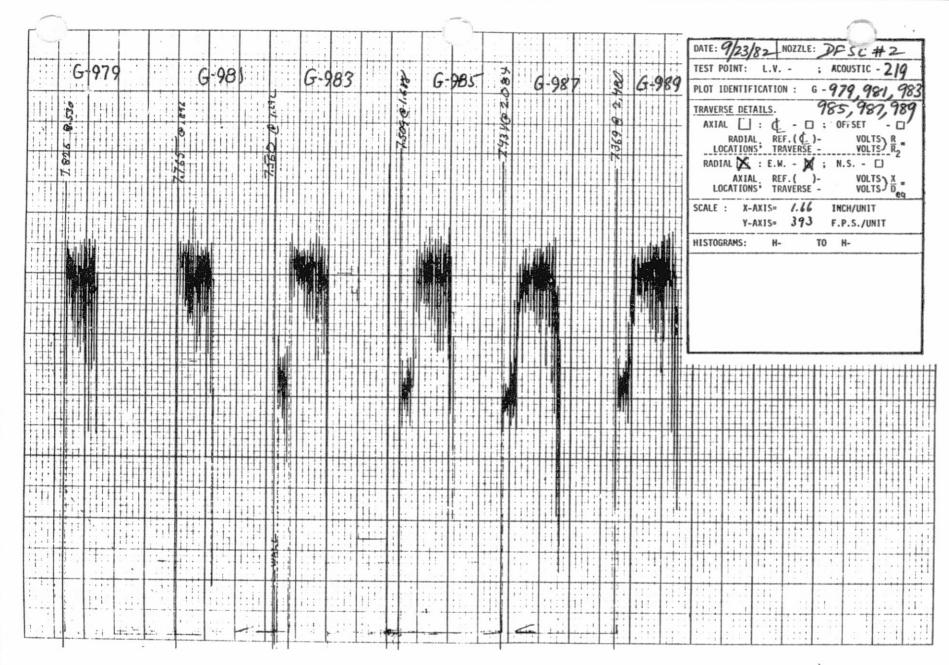
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LOCATIONS' TRAVERSE - VOLTS R

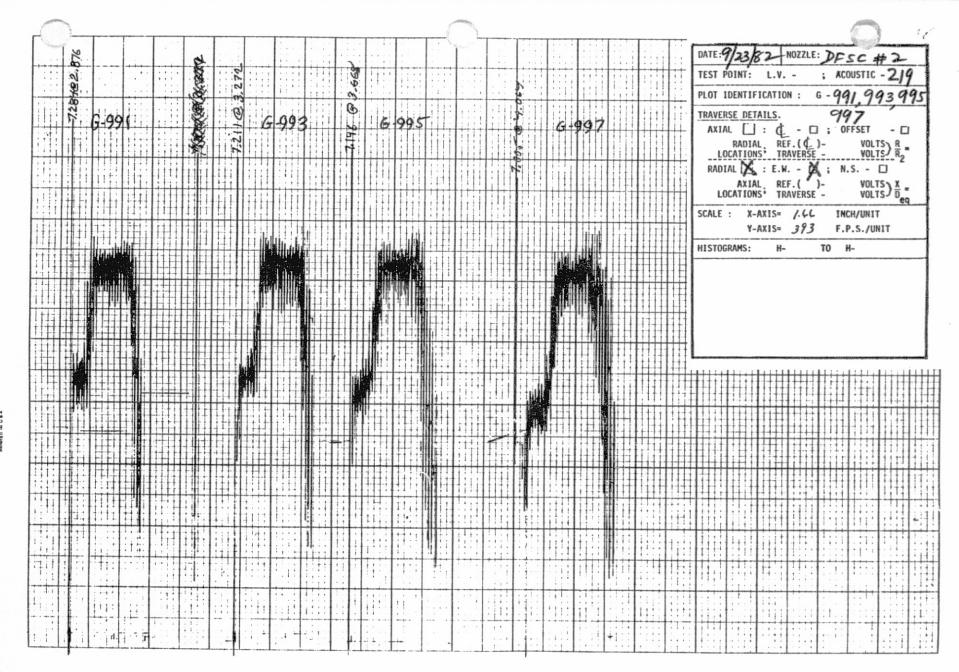
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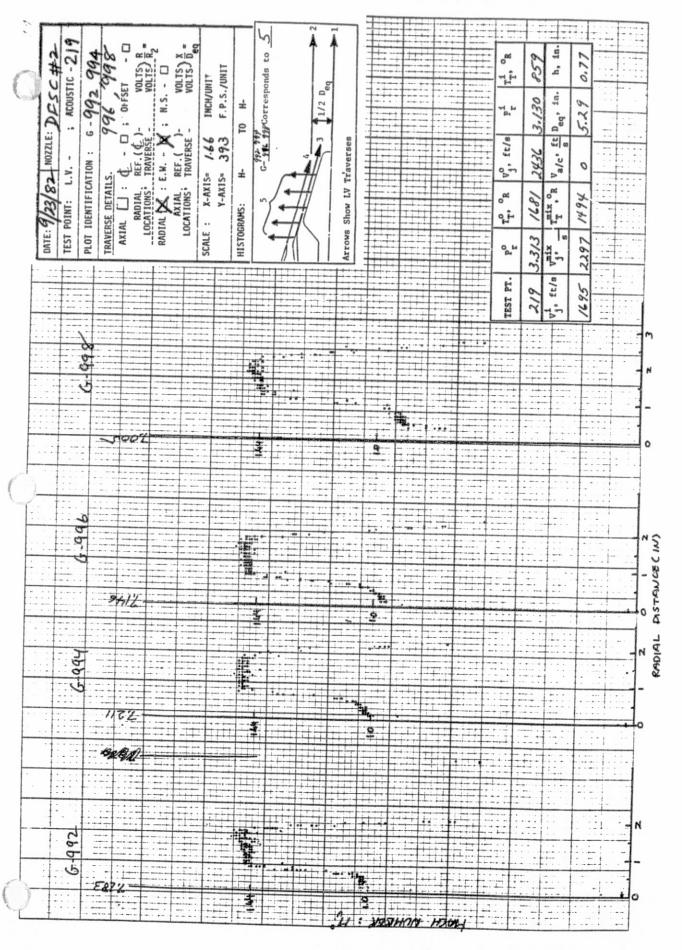


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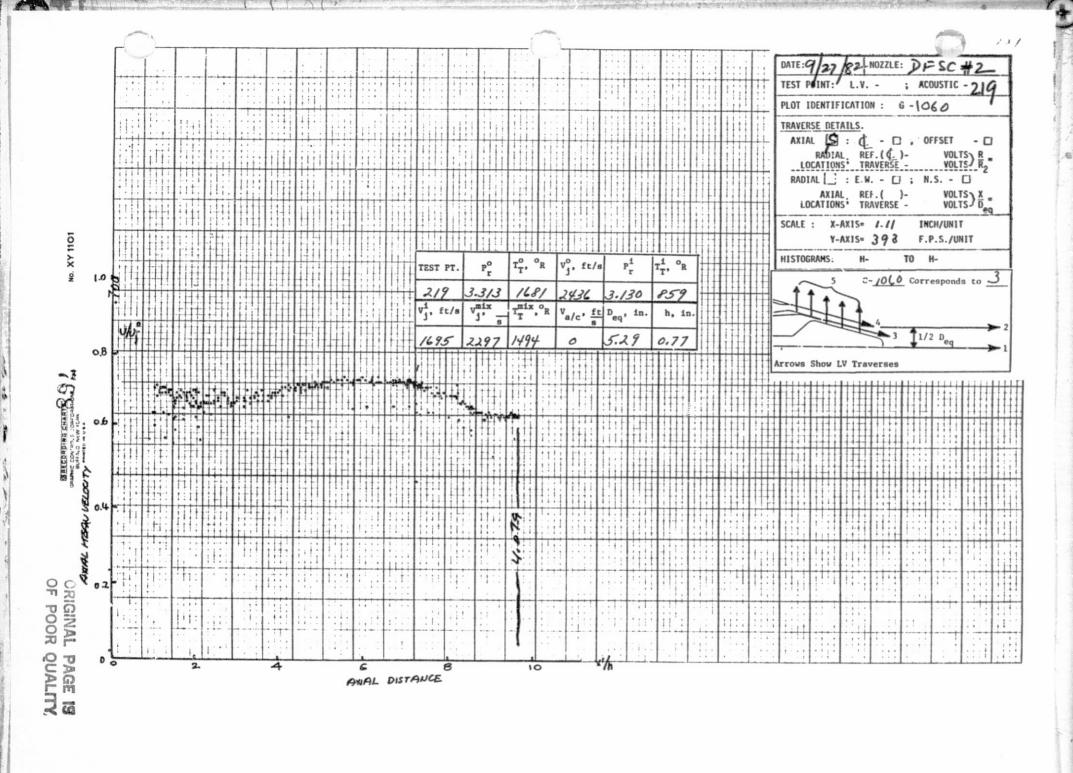


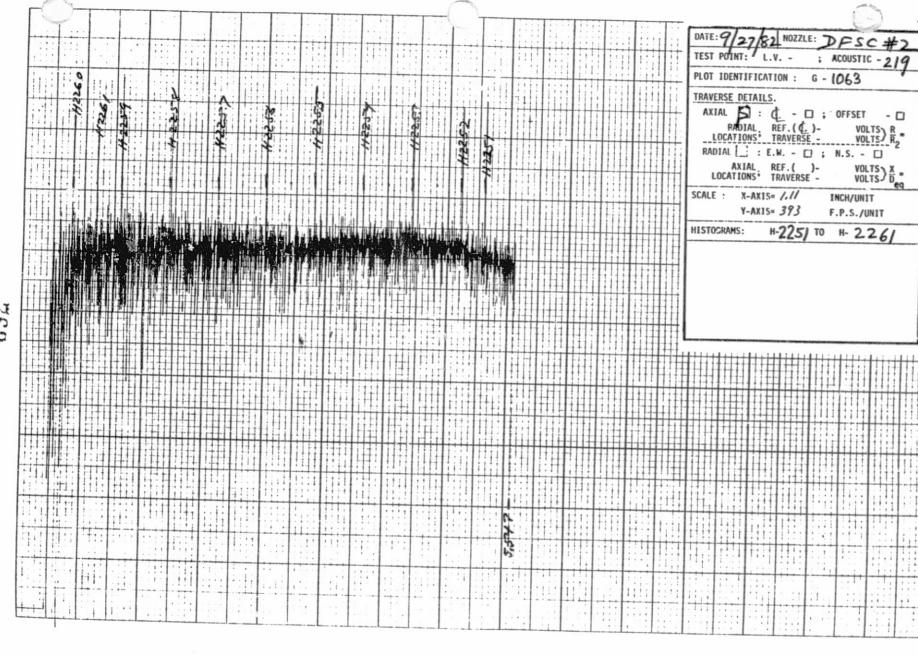
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RESTOR NEW YORK
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NOZZLE: DF SC #2 TEST POINT: L.V. -: ACOUSTIC - 219 PLOT IDENTIFICATION : G - 1061 TRAVERSE DETAILS. AXIAL S: (-); OFFSET - D

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LOCATIONS TRAVERSE - VOLTS R = RADIAL [: E.W. - [] ; N.S. - [] $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= /-// INCH/UNIT Y-AXIS= 393 F.P.S./UNIT HISTOGRAMS: TO H-3 x 11

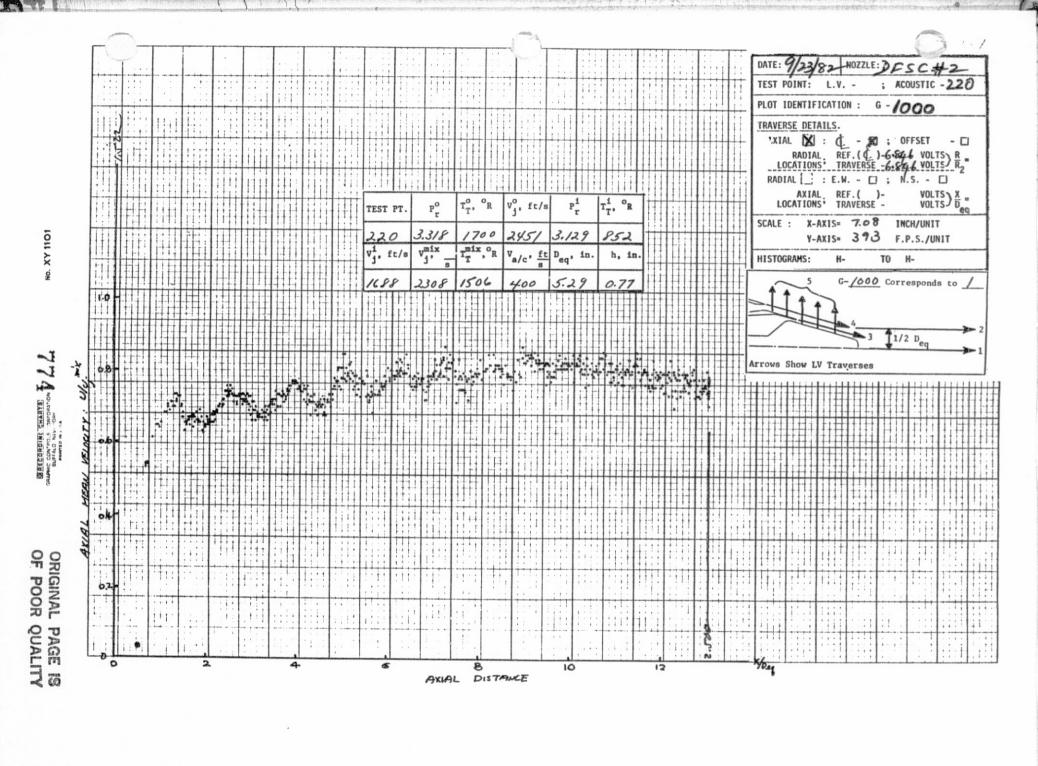
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NOZZLE: DFSC #2 ; ACOUSTIC -220 TEST POINT: L.V. -PLOT IDENTIFICATION : G - 999 40% TRAVERSE DETAILS. AXIAL X : Q - X : OFFSET - C RADIAL REF. (Q)-6.846 VOLTS) R LOCATIONS' TRAVERSE - 6.80 VOLTS R R $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= 7.08 INCH/UNIT F.P.S./UNIT Y-AXIS= 393 HISTOGRAMS: TO Htiin 11: 1 2.500



NOZZLE: DESC#2 ; ACOUSTIC -220 TEST POINT: L.V. -42221 42226 PLOT IDENTIFICATION : G - 1001 42228 H222 H 222. 43224 42217 TRAVERSE DETAILS. # 2216 41220 42230 AXIAL M: d - D; OFFSET - B

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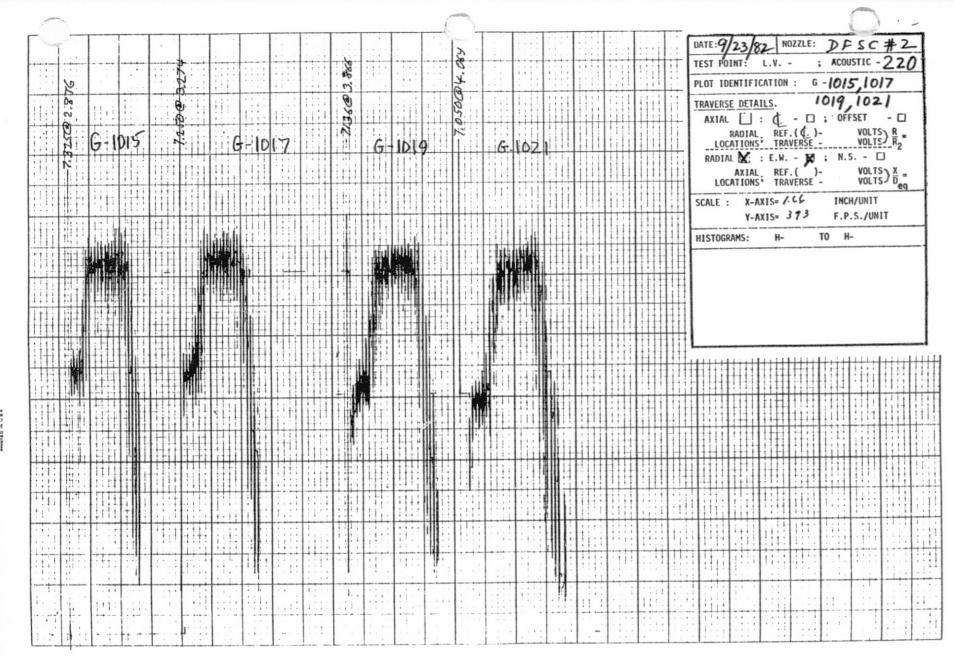
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BUFFALO NEW YORK



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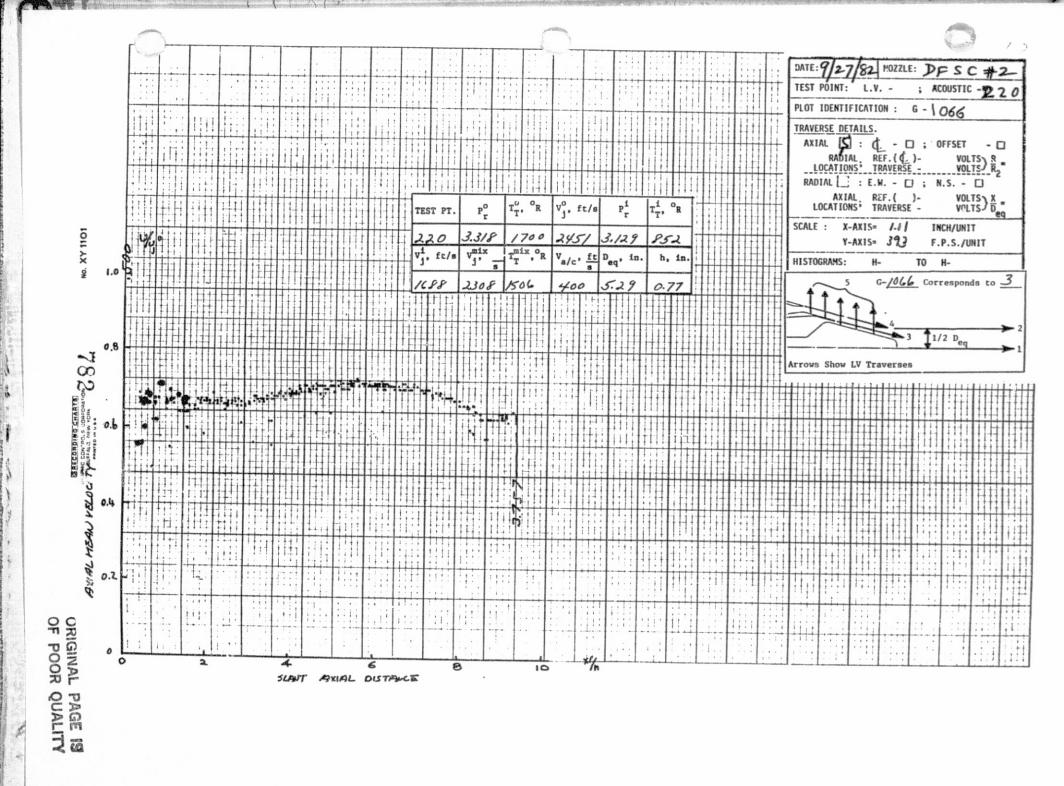
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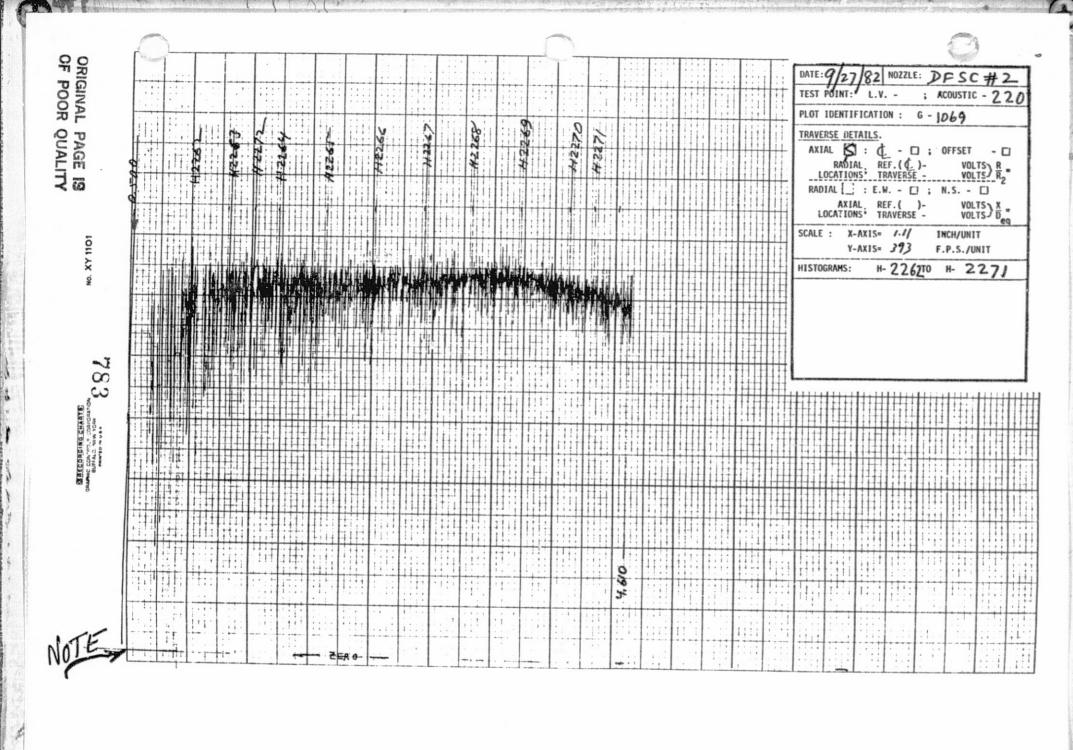
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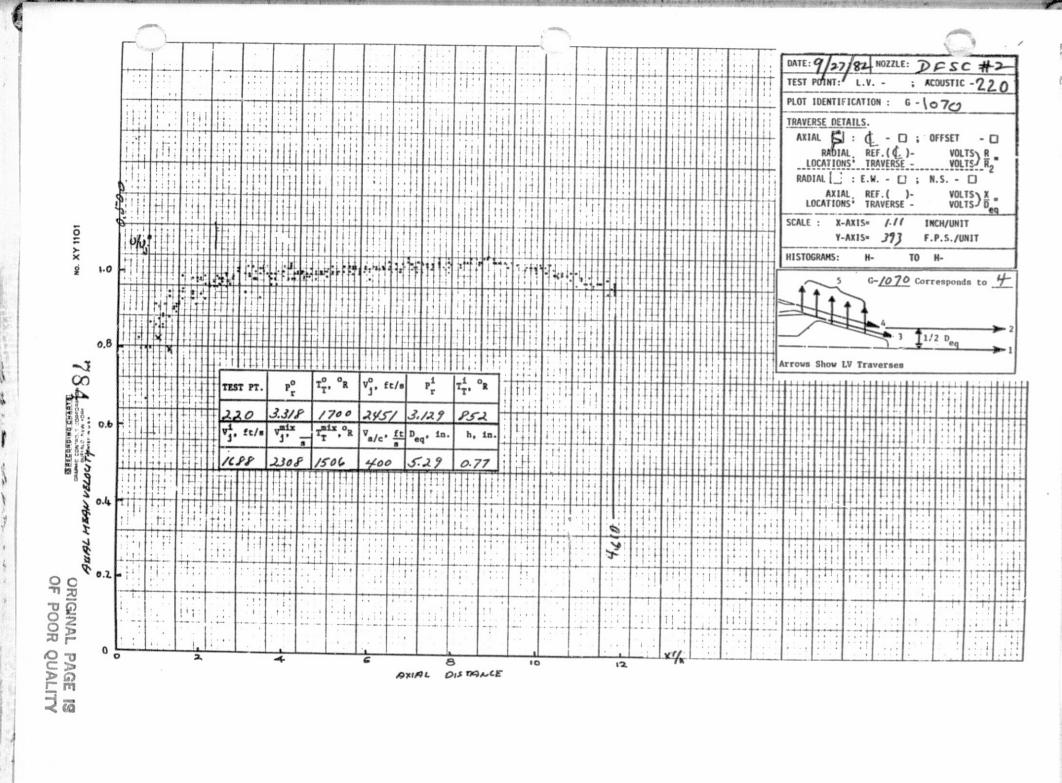
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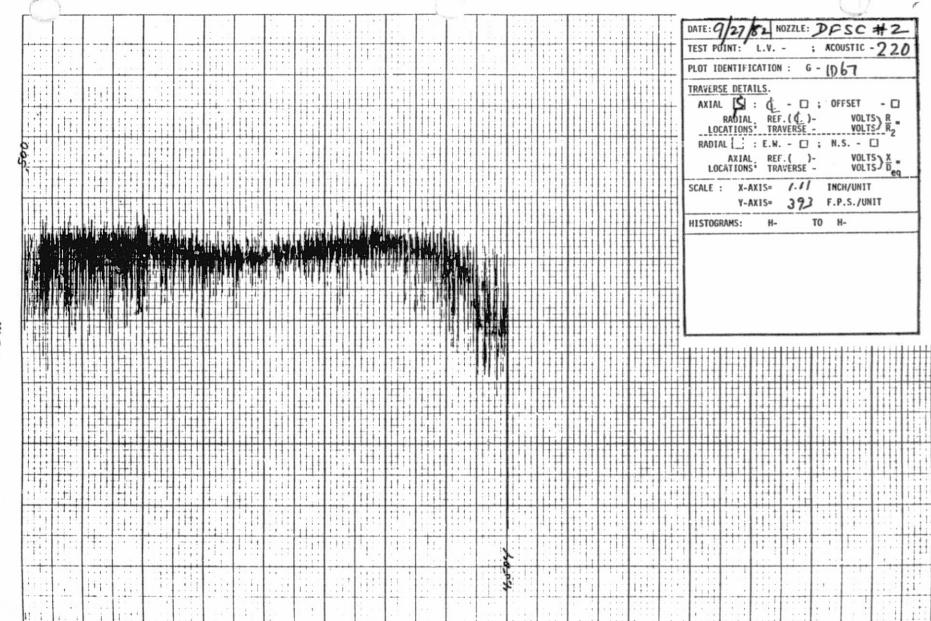
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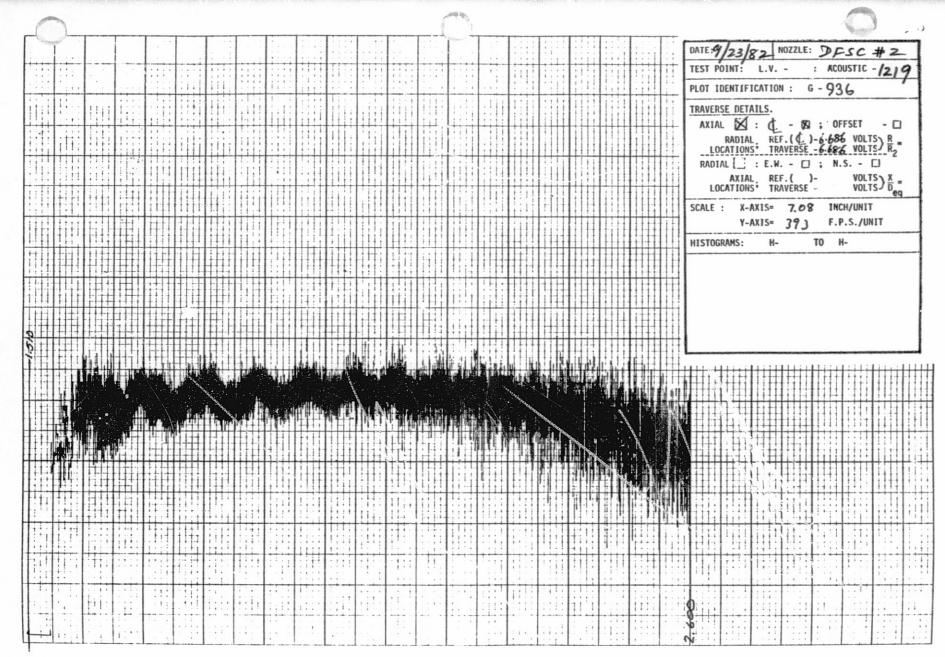


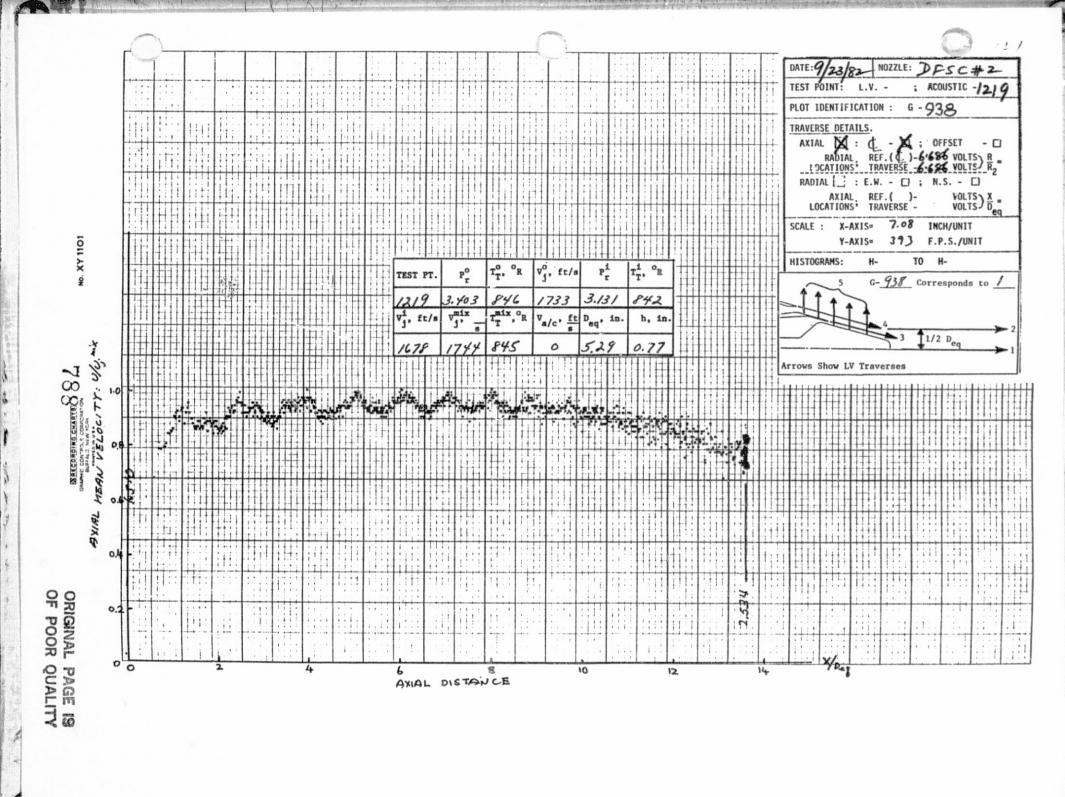


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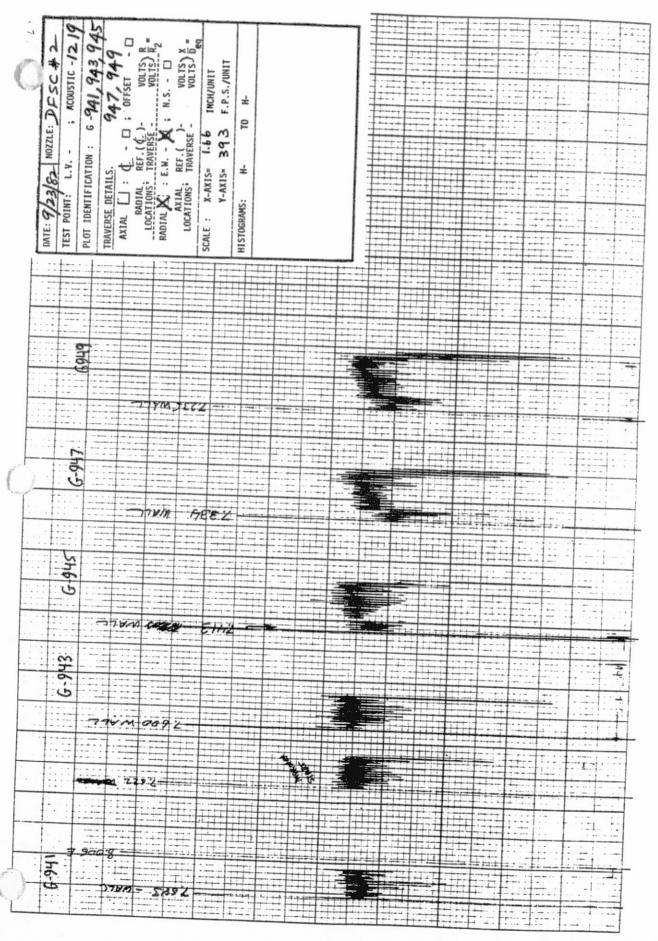
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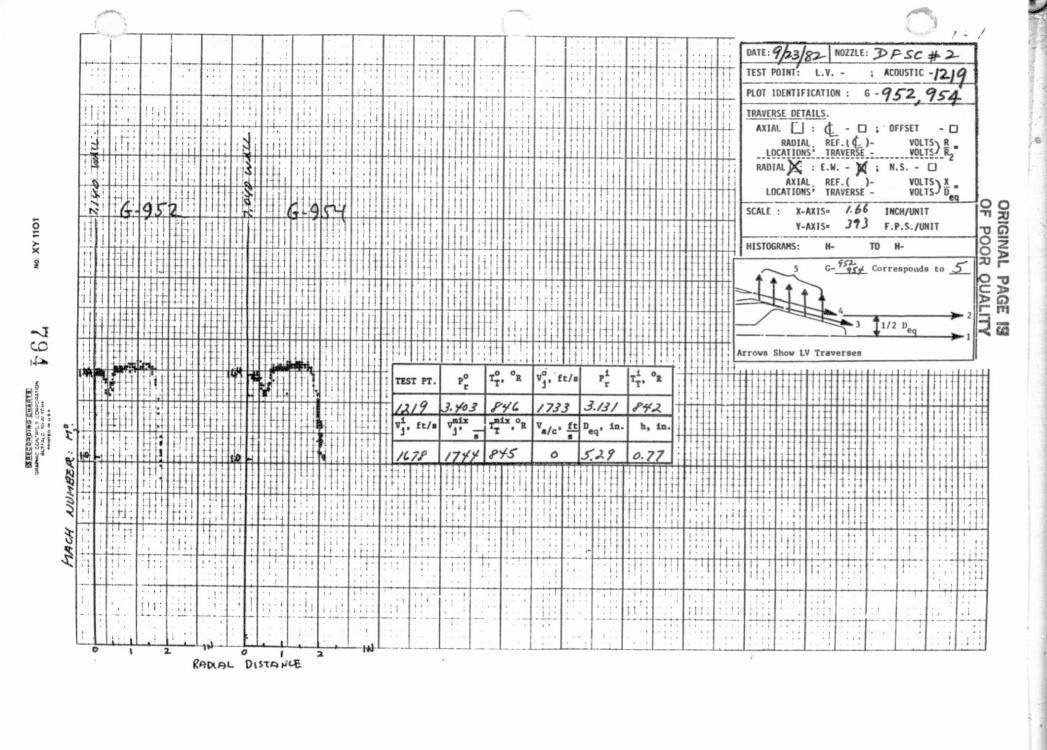
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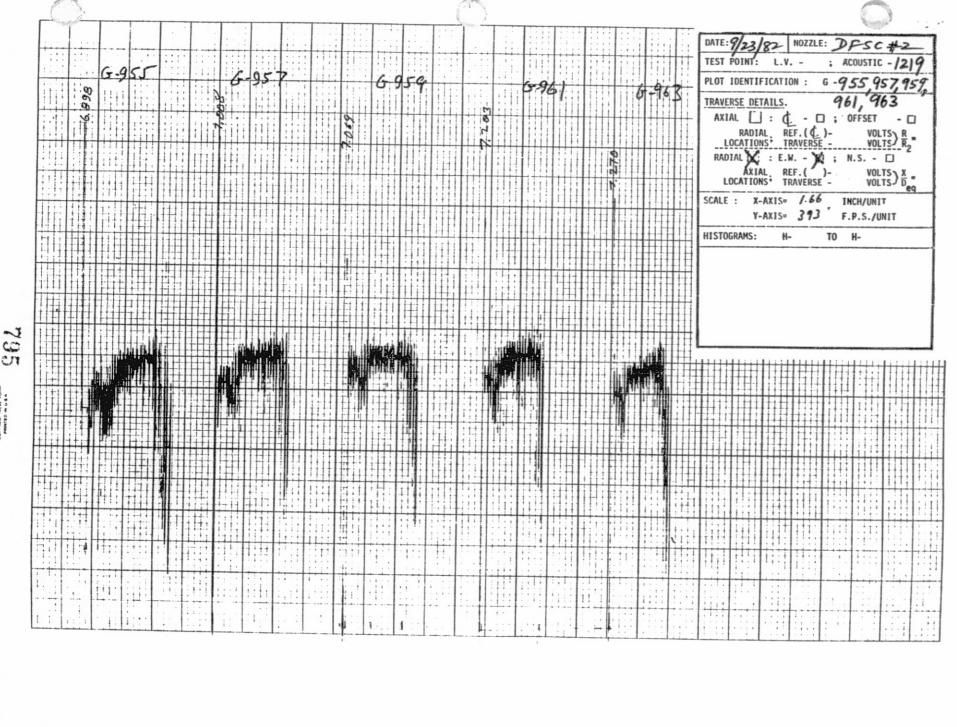
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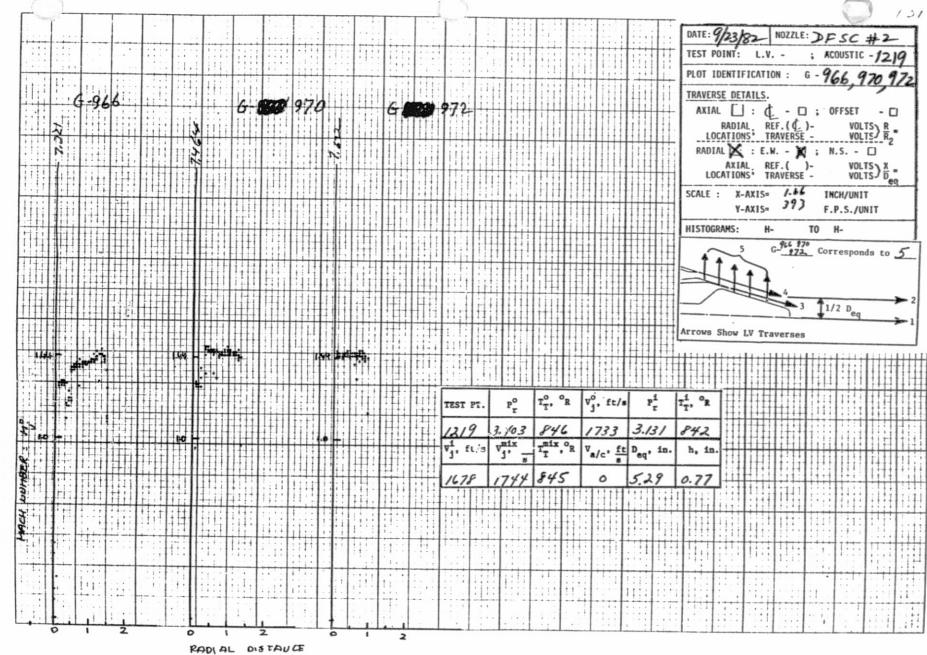
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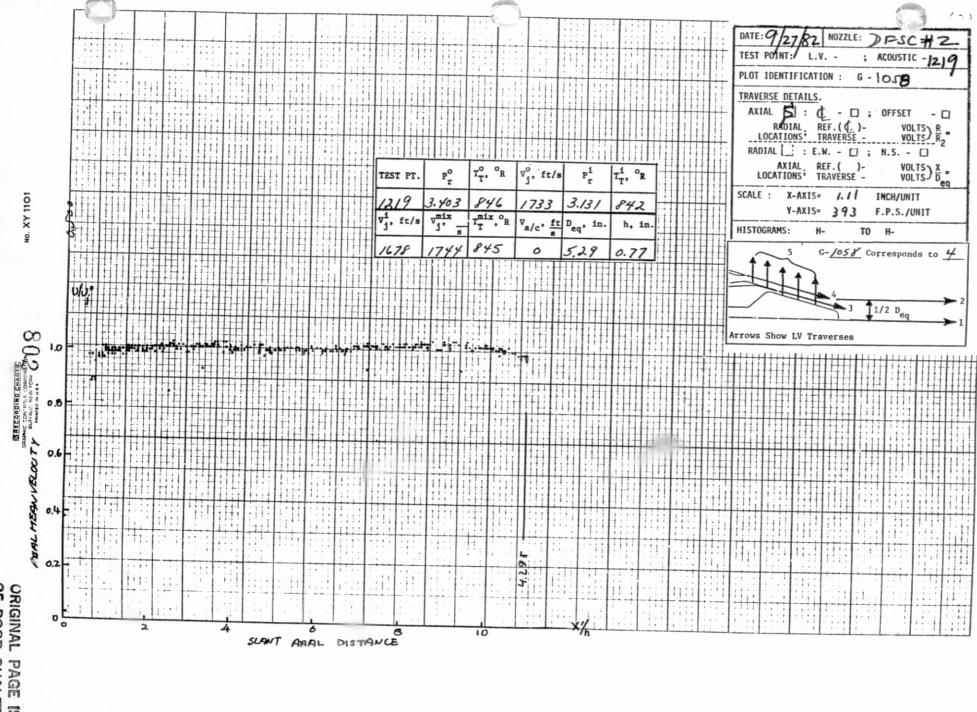
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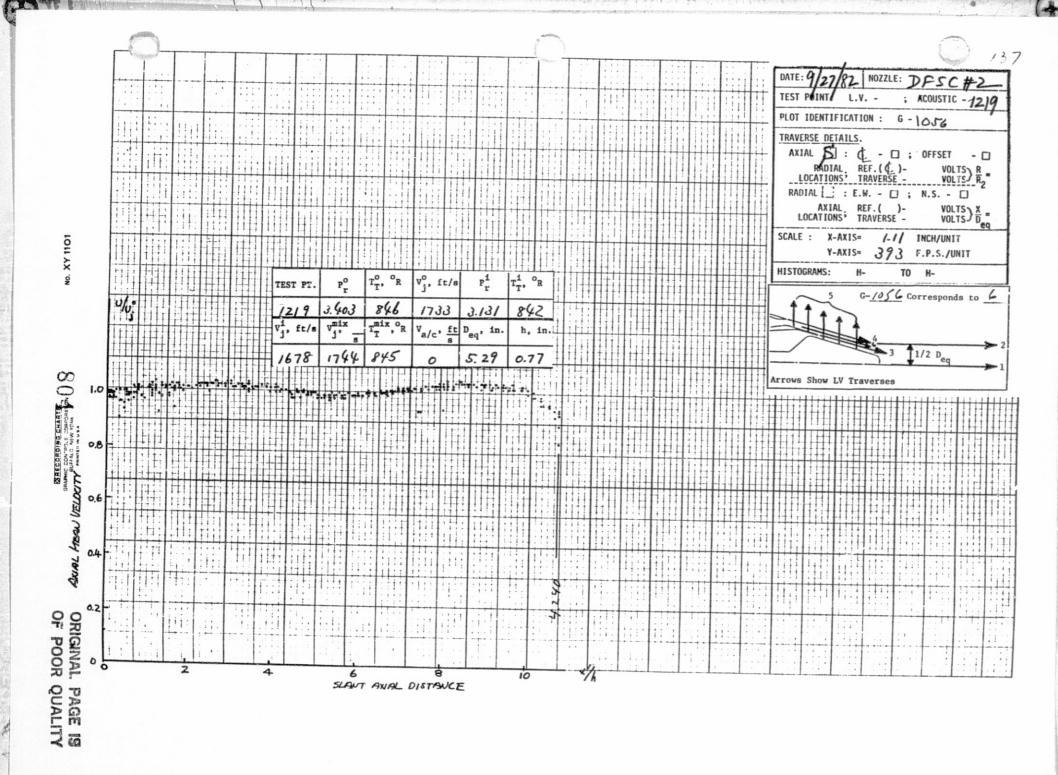
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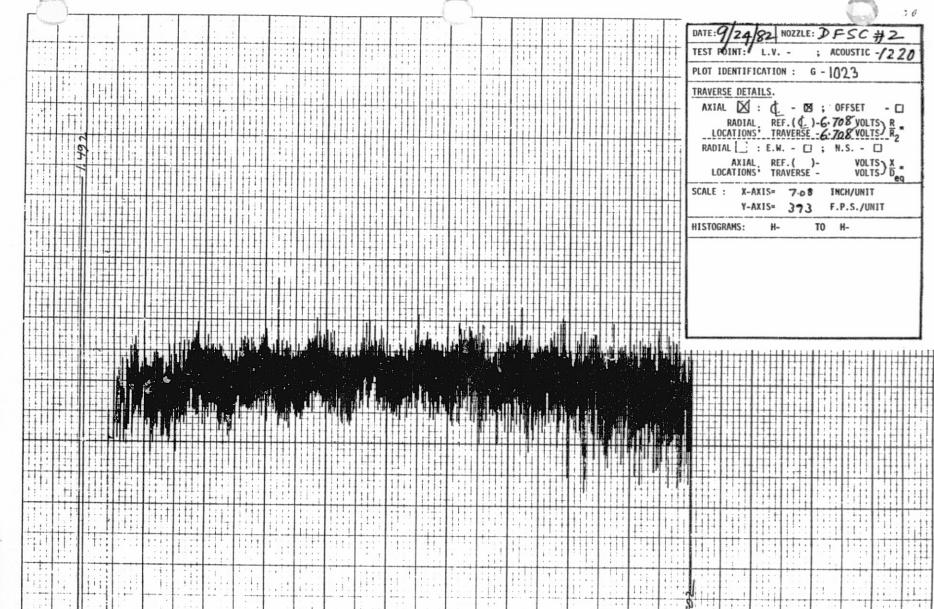
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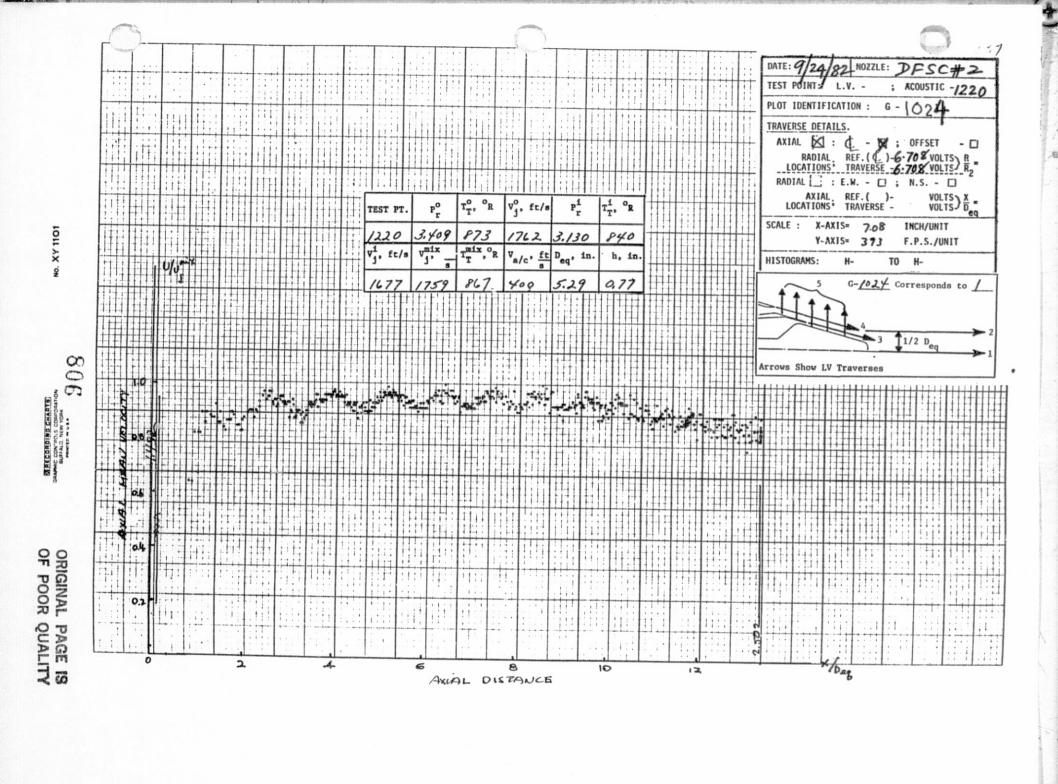


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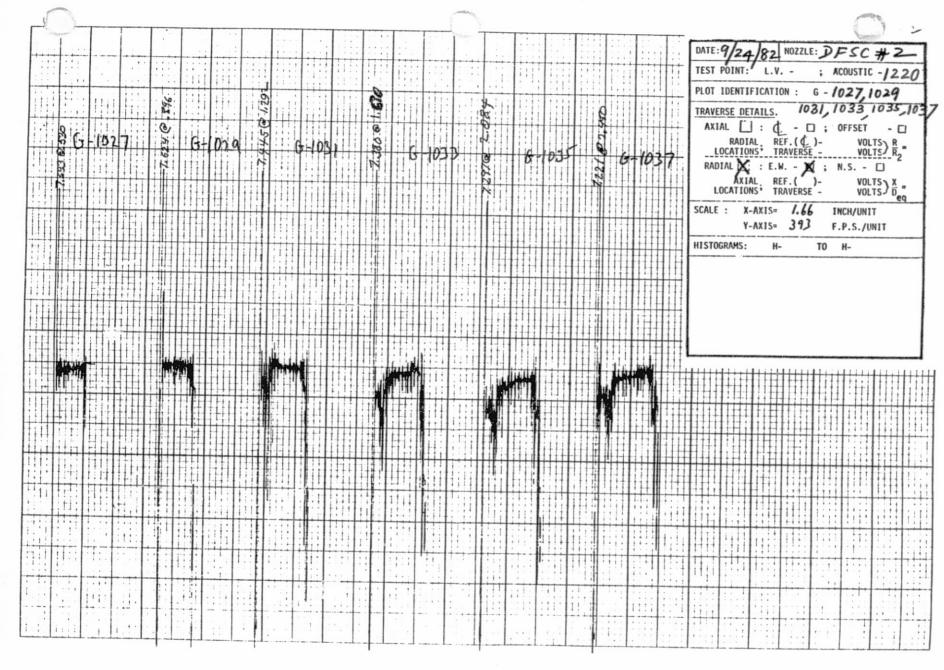
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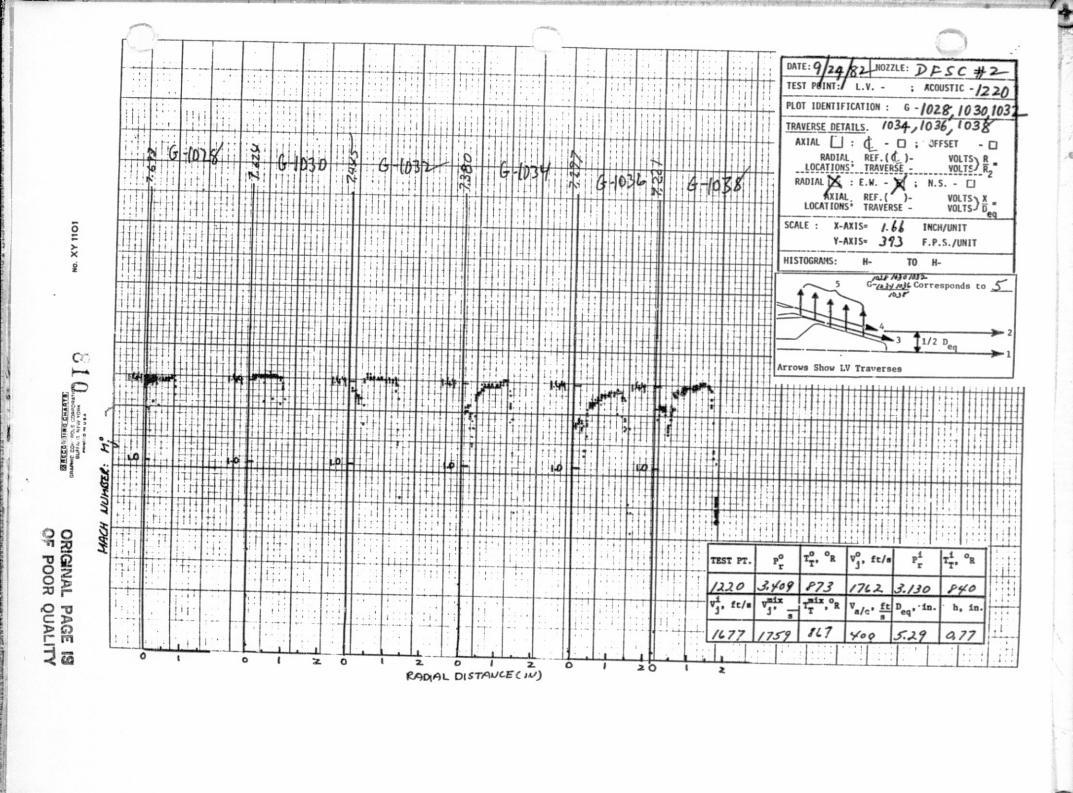
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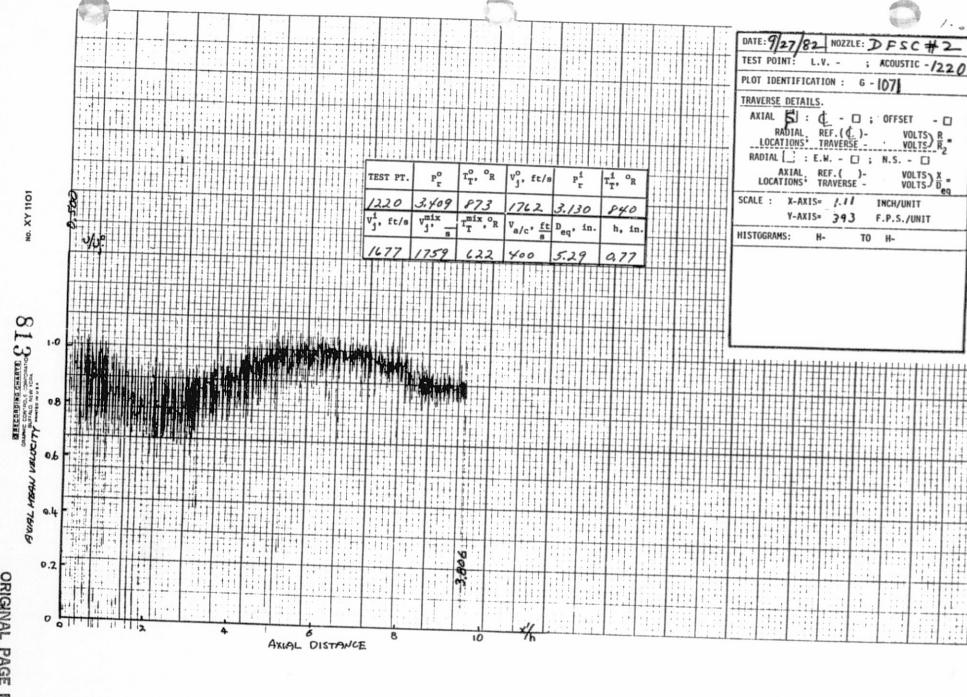
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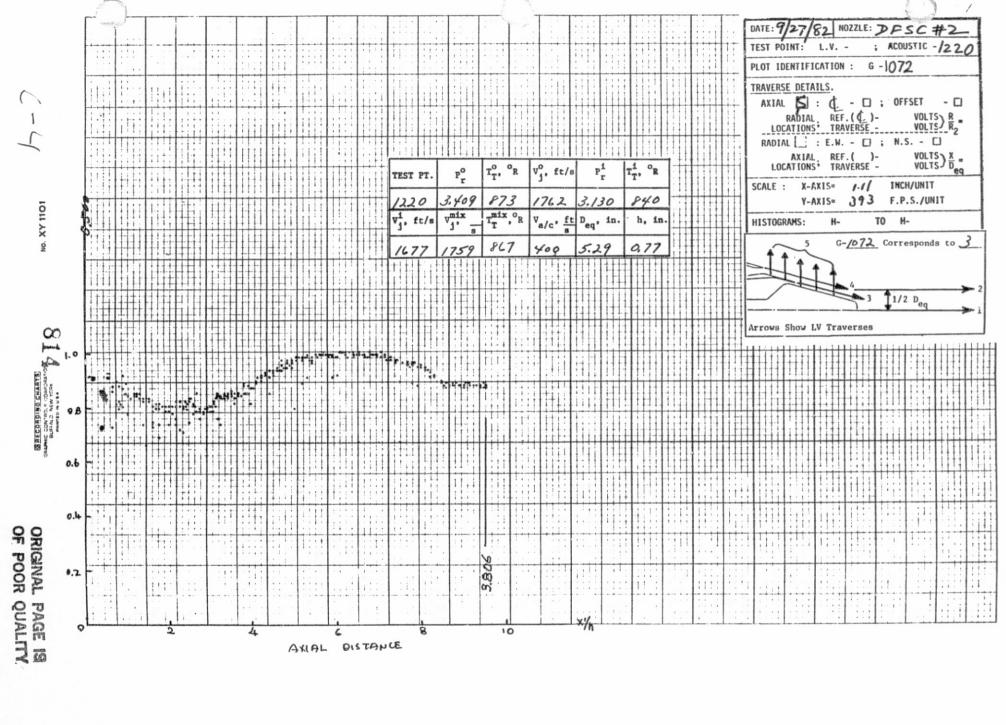
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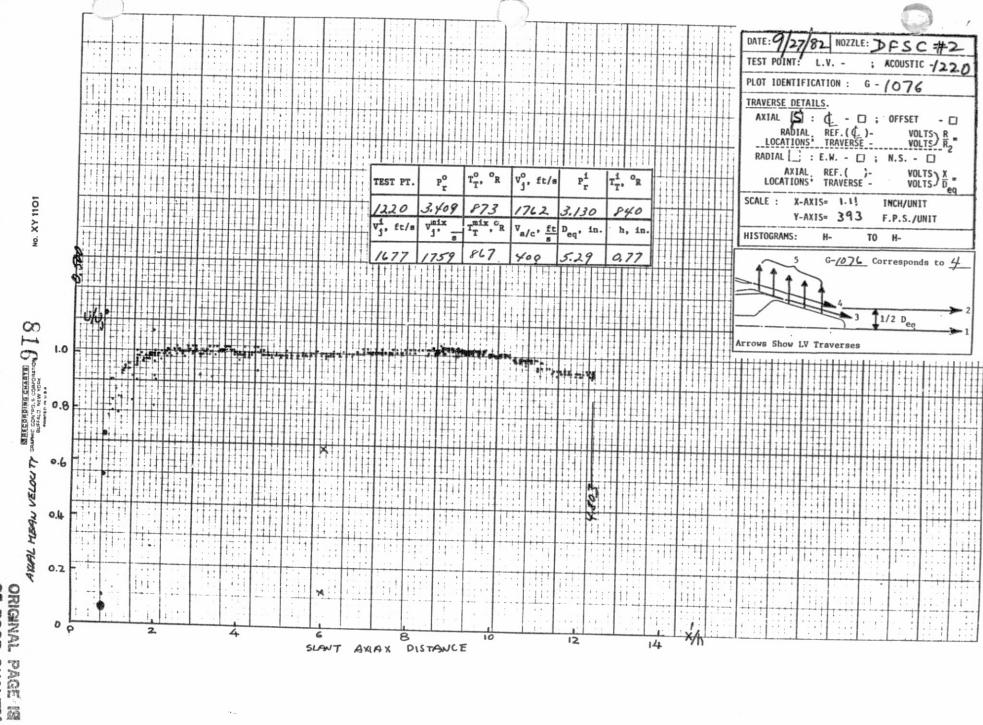
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RADIAL REF. (d.) - VOLTS R.

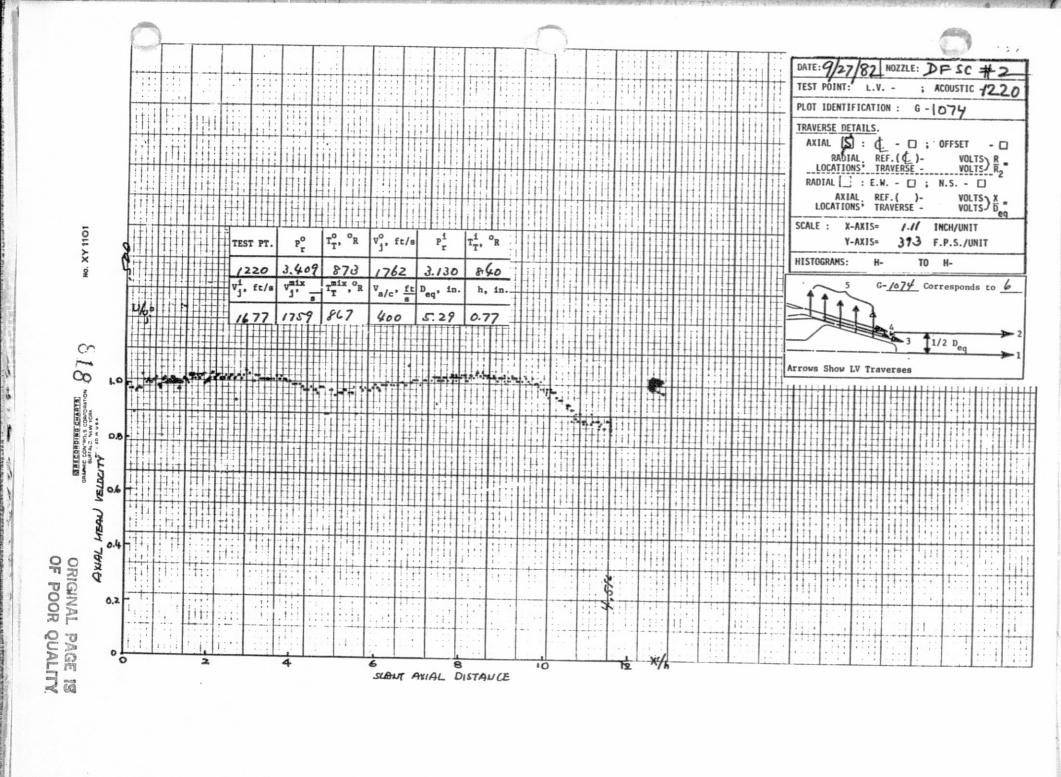
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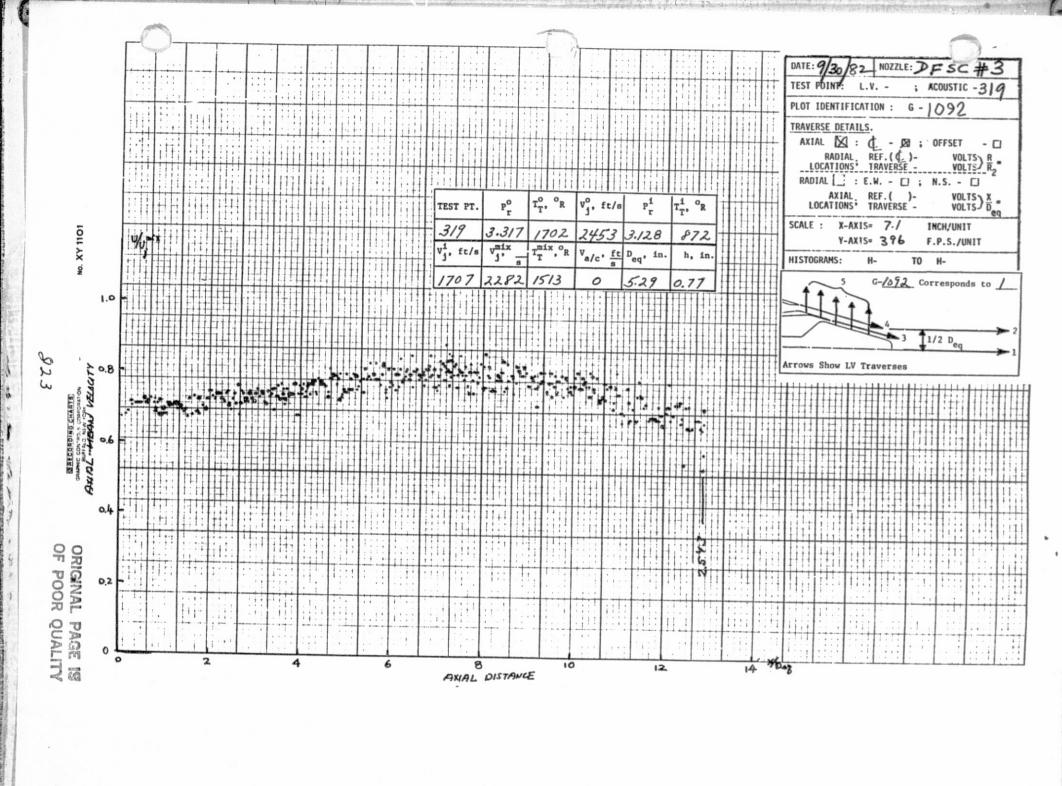
DATE: 9/30/82 NOZZLE: DFSC # 3 TEST POINT: L.V. -: ACOUSTIC -319 PLOT IDENTIFICATION : G - 1091 TRAVERSE DETAILS. AXIAL X : C - X ; OFFSET - C

RADIAL REF. (C) - VOLTS R
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RADIAL : E.W. - : N.S. - : $\frac{\text{VOLTS}}{\text{VOLTS}}$ $\frac{X}{D}_{\text{eq}}$ AXIAL REF.()-LOCATIONS' TRAVERSE -SCALE : X-AXIS= 7./ INCH/UNIT Y-AXIS= 396 F.P.S./UNIT HISTOGRAMS: TO Hn 111

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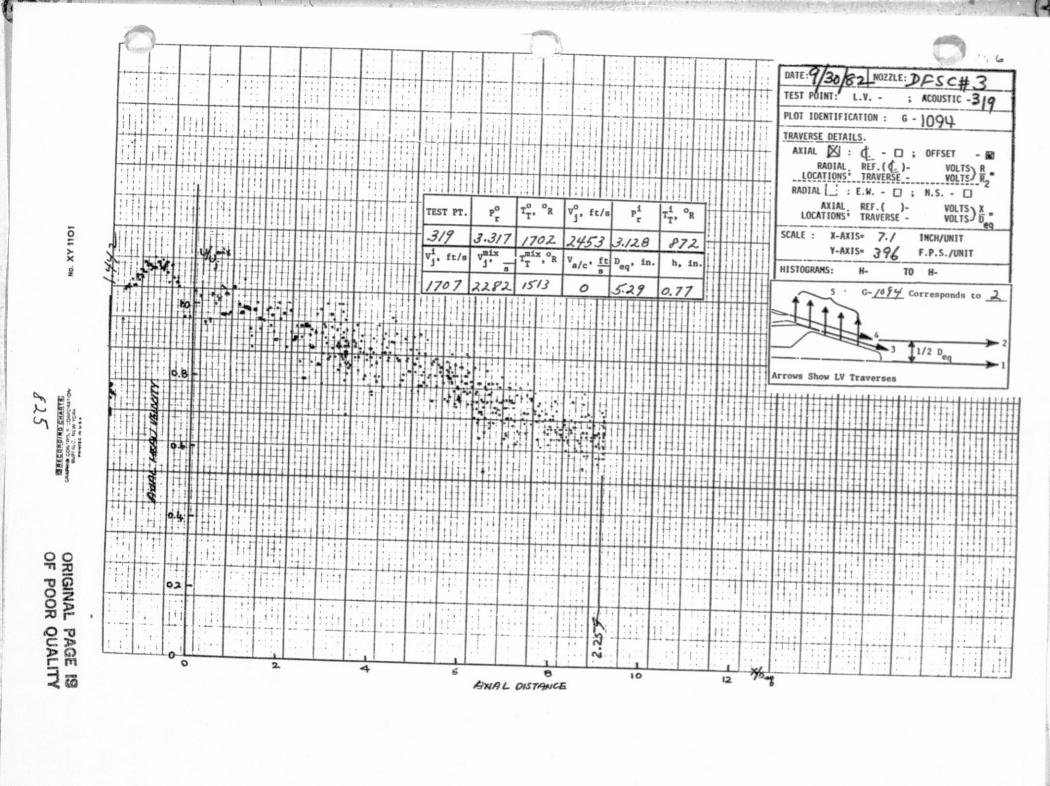
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DATE: 9/30/82 NOZZLE: DFSC#3

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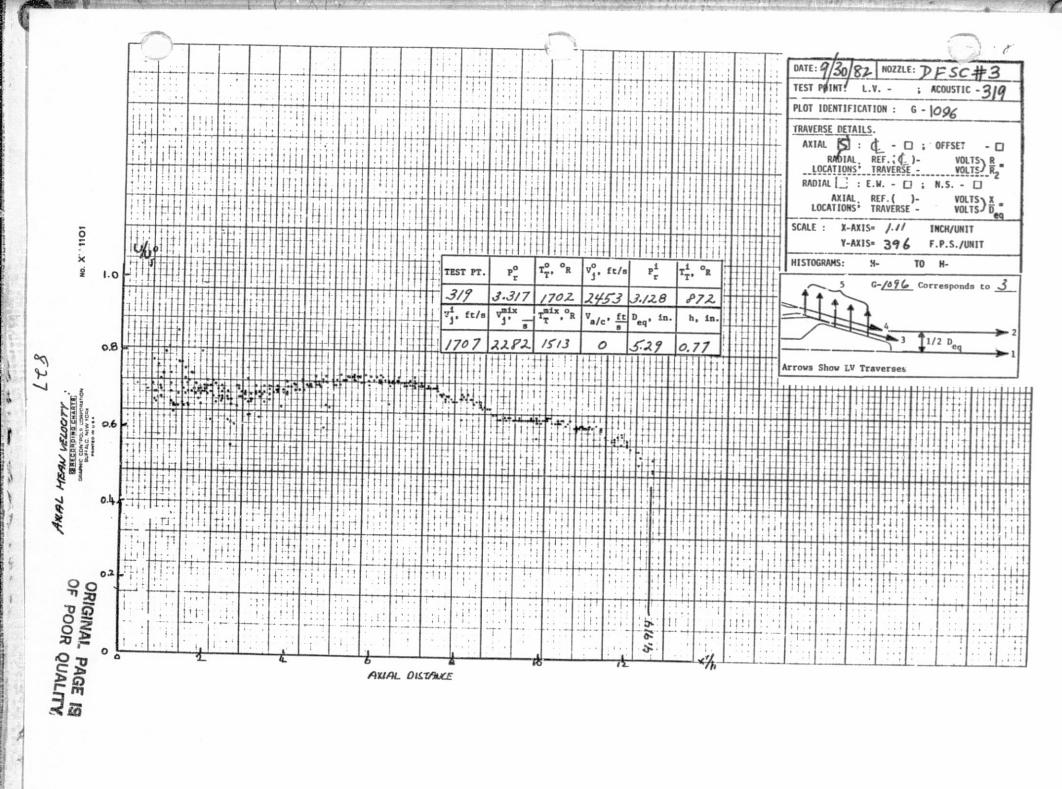
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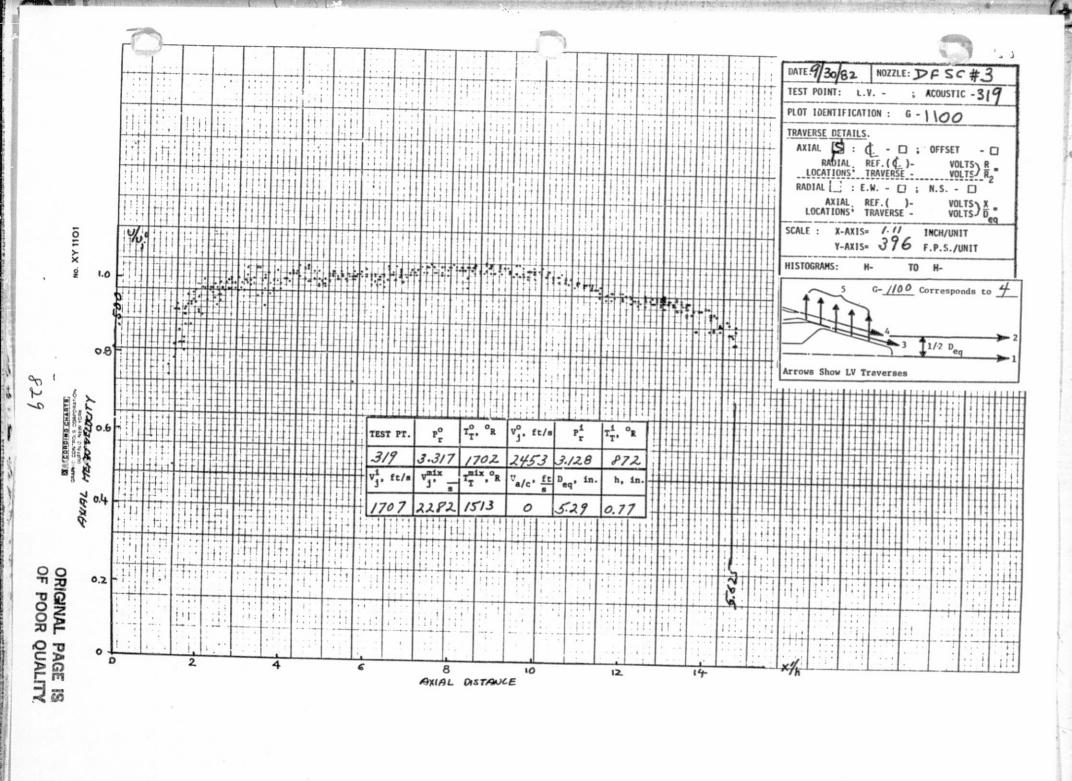


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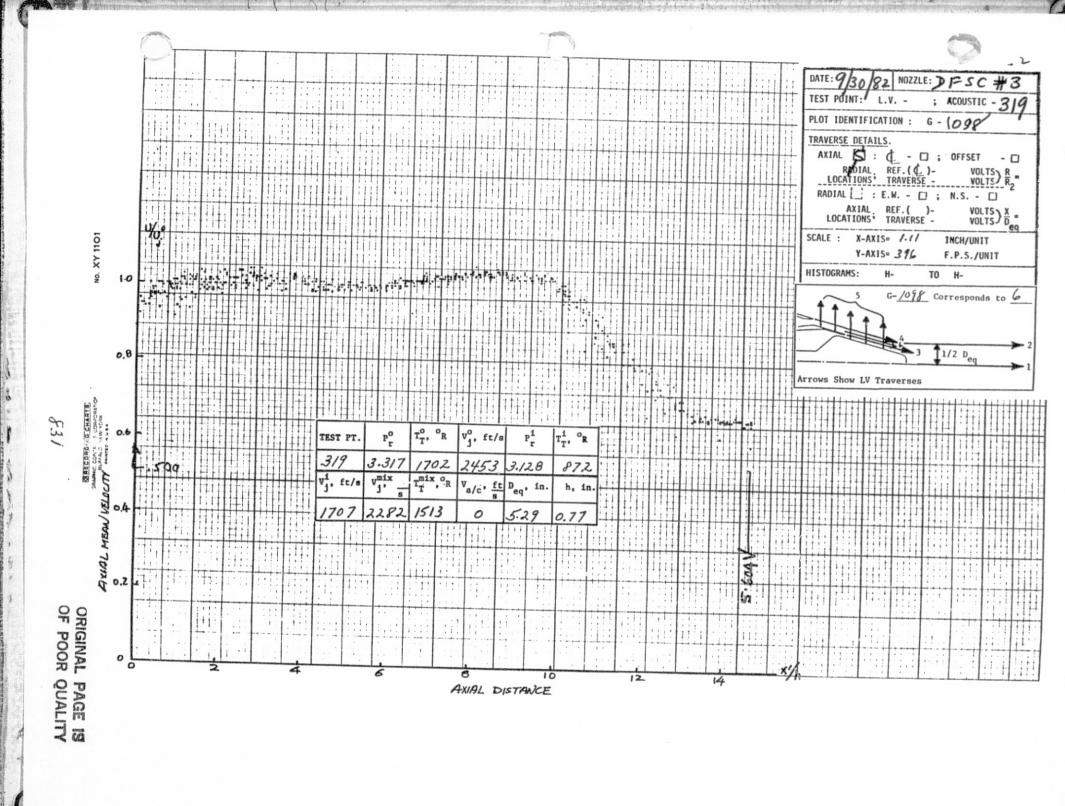
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TEST POINT! L.V. -PLOT IDENTIFICATION : G - 1097 TRAVERSE DETAILS. AXIAL S : Q - D ; OFFSET - D RADIAL REF.(Q)- VOLTS) R VOLTS R ROTAL C : E.W. - D ; N.S. - D $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= /.// INCH/UNIT F.P.S./UNIT Y-AXIS= 396 TO H-HISTOGRAMS: 111

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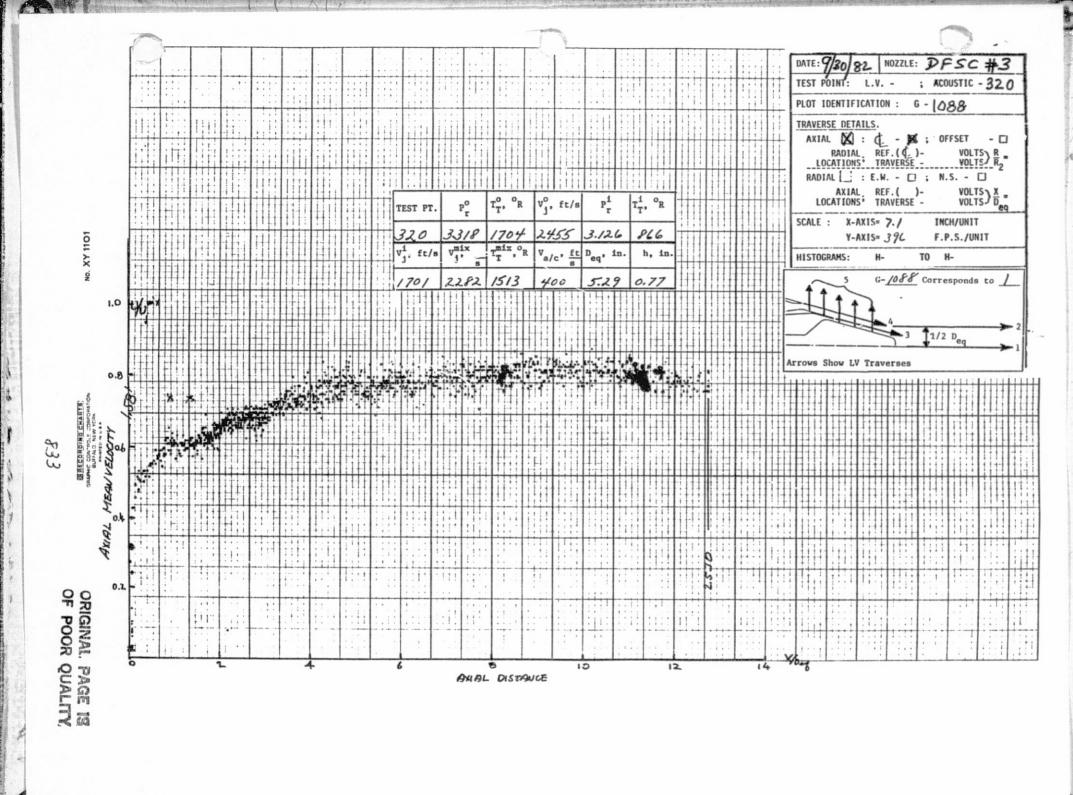


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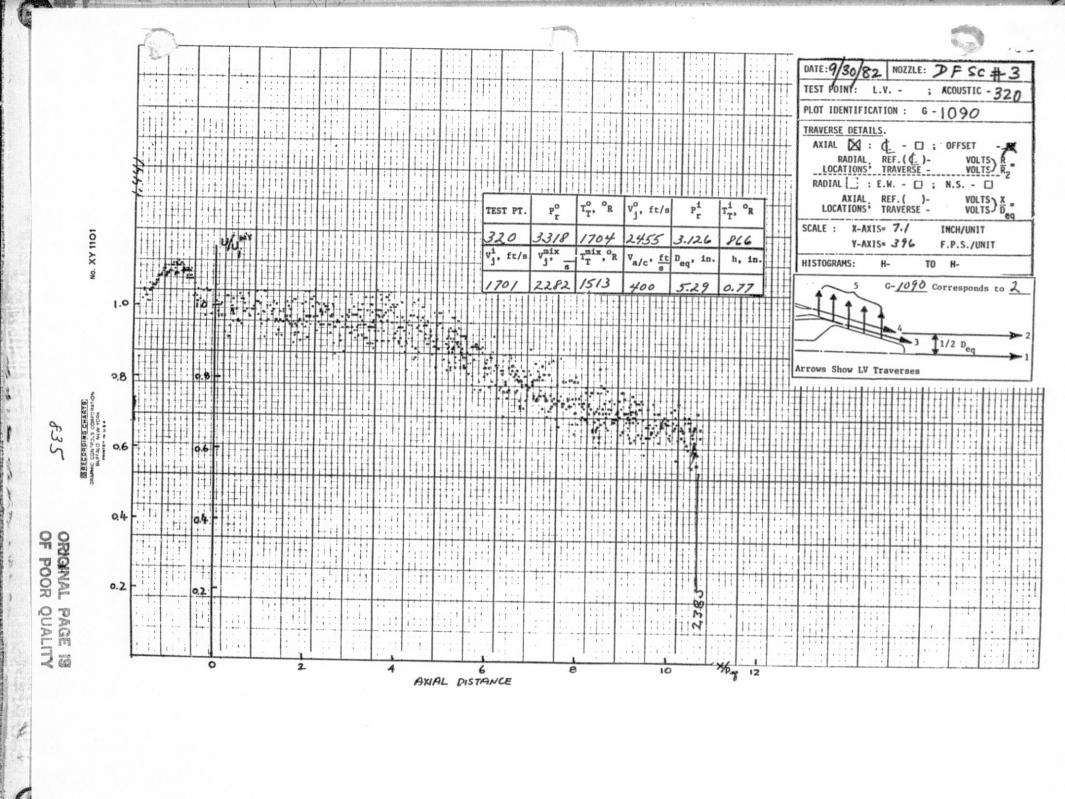
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DATE: 9/30/82 NOZZLE: DFSC #3 TEST POINT: L.V. -; ACOUSTIC - 320 PLOT IDENTIFICATION : G-1089 TRAVERSE DETAILS. AXIAL : (- | ; OFFSET - | RADIAL REF. () - VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R VOLTS | R V AXIAL REF.()-LOCATIONS TRAVERSE - $\frac{\text{VOLTS}}{\text{VOLTS}}$ $\frac{X}{D_{eq}}$ SCALE : X-AXIS= 7./ INCH/UNIT Y-AXIS= 394 F.P.S./UNIT HISTOGRAMS: TO H-1

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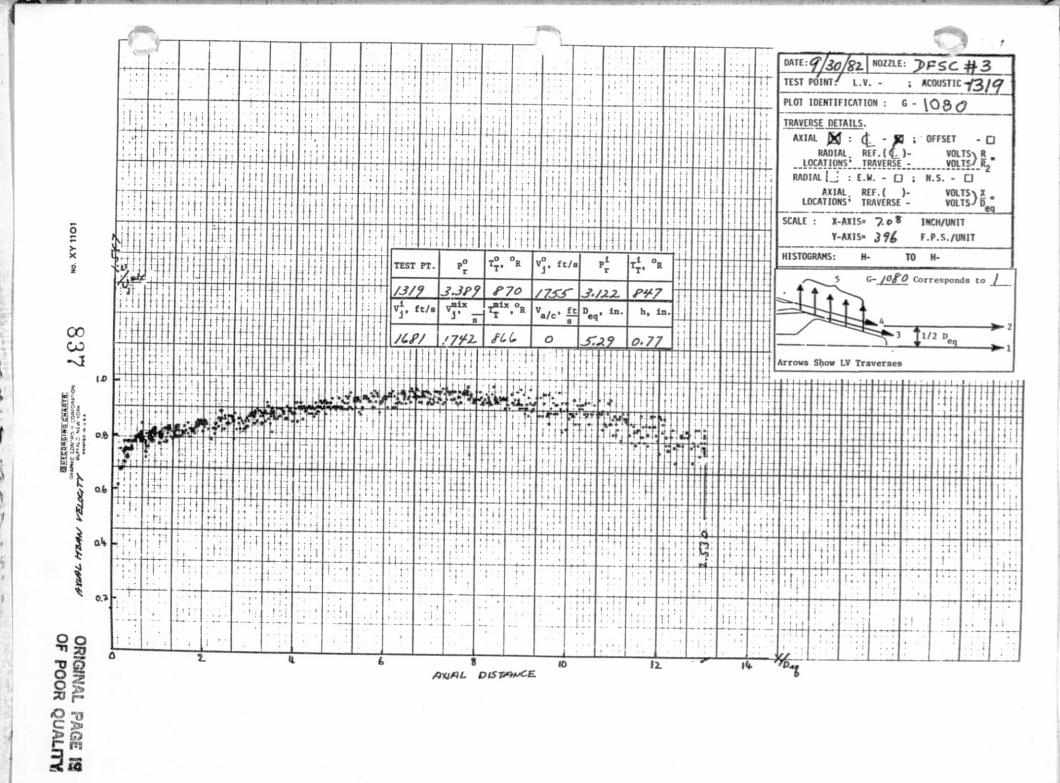


NOZZLE: DFSC TEST POINT! L.V. -PLOT IDENTIFICATION : 6-1079 TRAVERSE DETAILS. AXIAL M: Q - M; OFFSET - C RADIAL REF. (Q) - VOLTS) R VOLTS R VOLTS RADIAL [: E.W. - [] ; N.S. - [] AXIAL, REF.()-LOCATIONS' TRAVERSE - $\frac{\text{VOLTS}}{\text{VOLTS}}$ SCALE : X-AXIS= 7.08 INCH/UNIT Y-AXIS= 396 F.P.S./UNIT HISTOGRAMS: TO H-111: 2,530

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TEST POINT: L.V. -; ACOUSTIC -1319 PLOT IDENTIFICATION : G - 1081 TRAVERSE DETAILS. AXIAL M: C - C; OFFSET - M

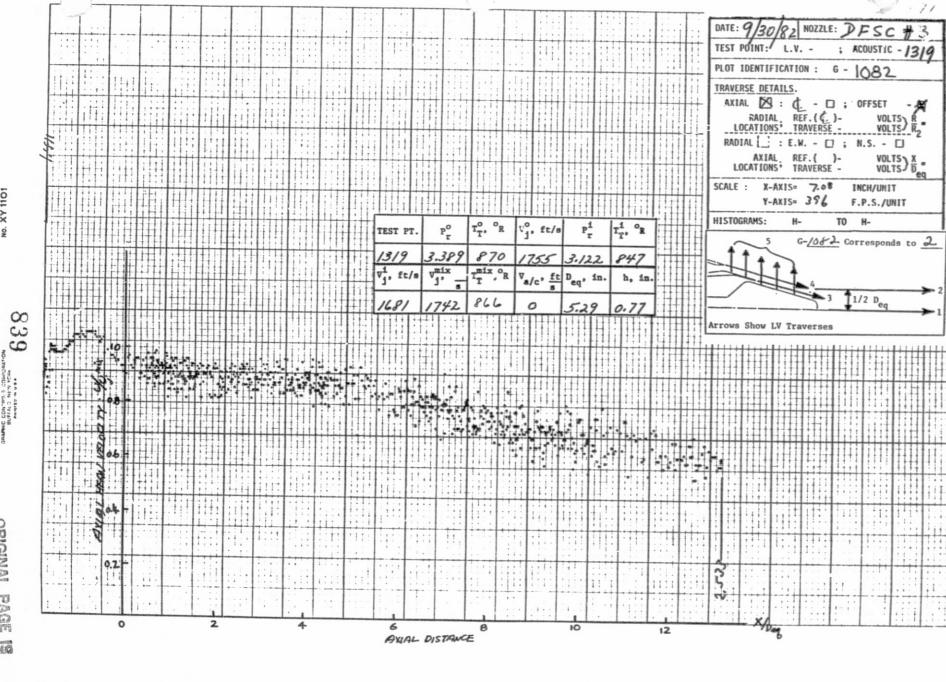
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LOCATIONS TRAVERSE - VOLTS R

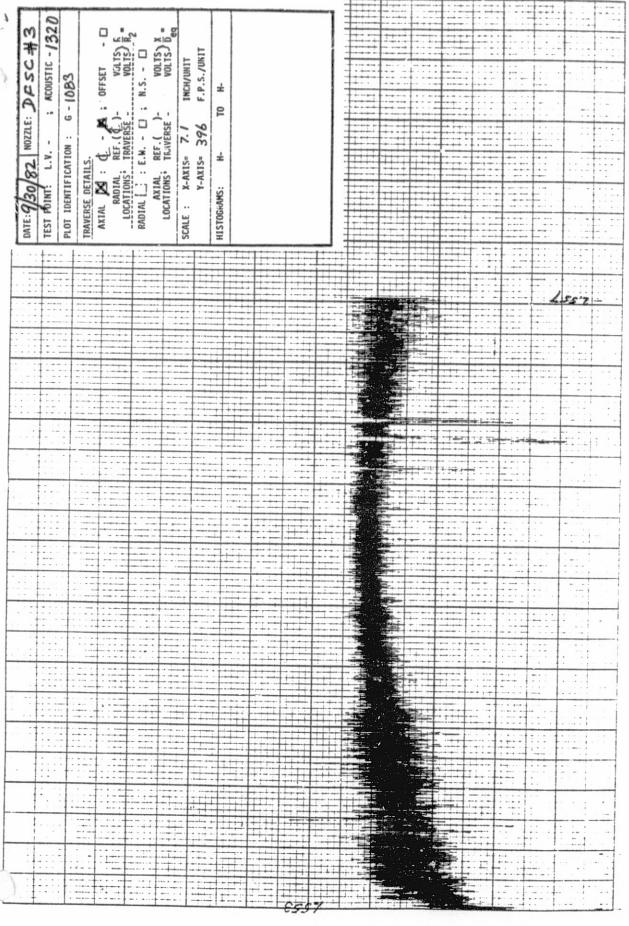
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GRAPHIC CONTROLS CORPORATION
BUFFALC NEW YORK
PRINTED IN USA



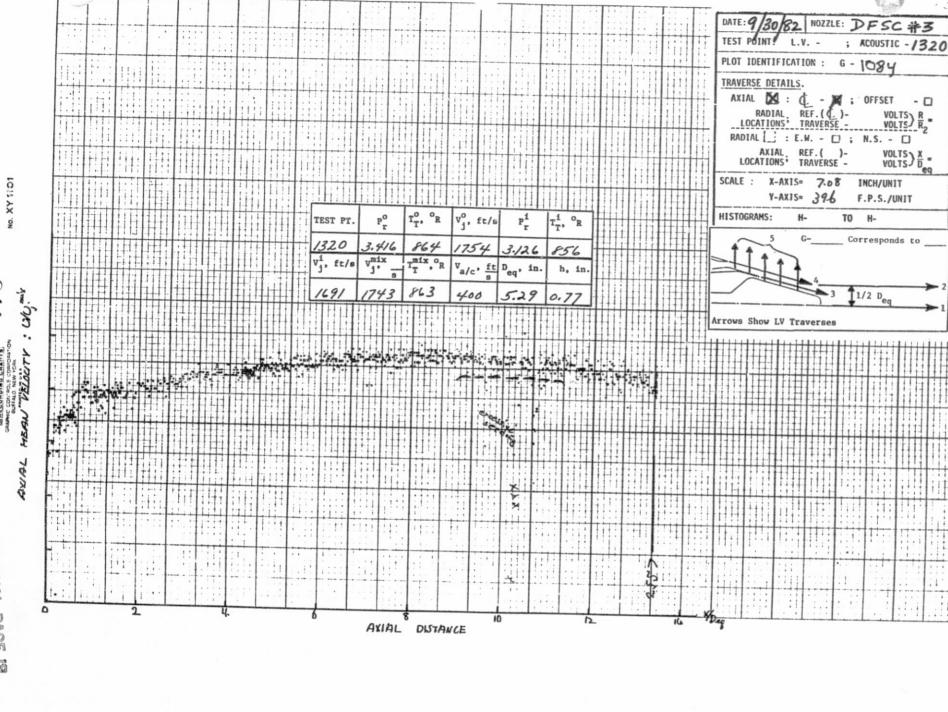
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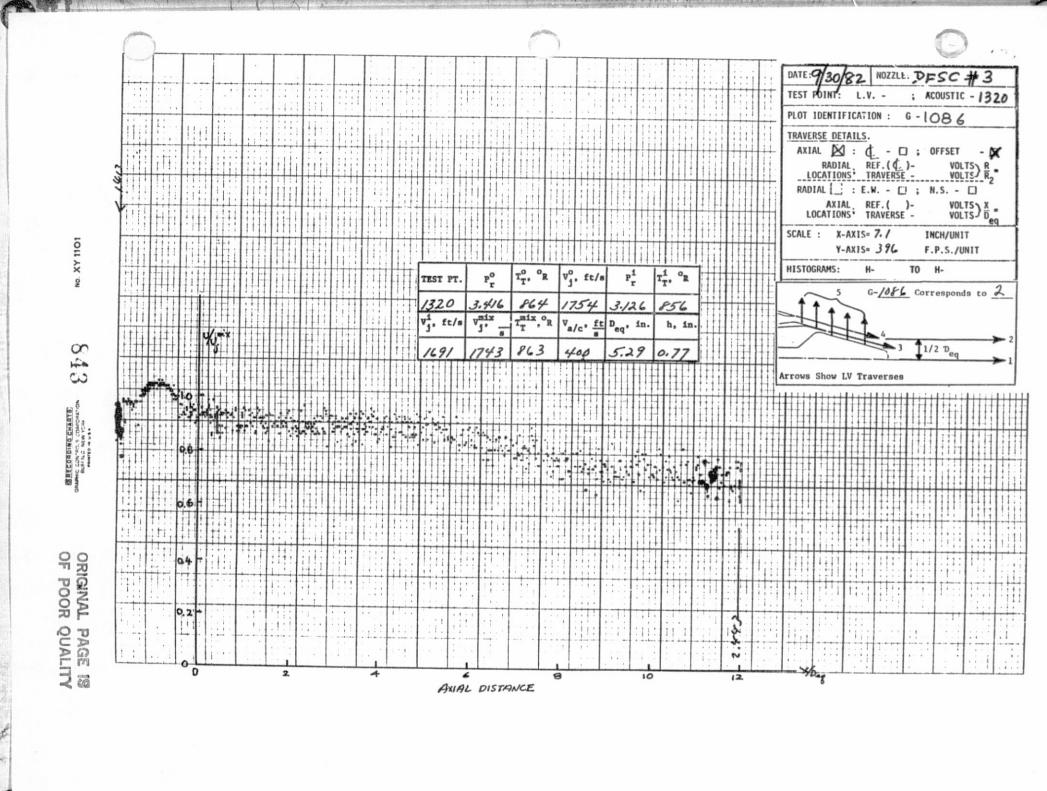
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TEST POINT: L.V. -; ACOUSTIC -/320 PLOT IDENTIFICATION : G - 1085 TRAVERSE DETAILS. AXIAL X : (-); OFFSET

RADIAL REF.(()- VOLTS
LOCATIONS TRAVERSE - VOLTS

RADIAL : E.W. - ; N.S. - ; $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= 7./ INCH/UNIT Y-AXIS= 396 F.P.S./UNIT HISTOGRAMS: TO H-1: 111:

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30/82 NOZZLE: DFSC #3 ; ACOUSTIC - 30/ TEST POINT: L.V. -PLOT IDENTIFICATION : G - 1077 TRAVERSE DETAILS. AXIAL X : Q - X ; OFFSET - C RADIAL REF. (Q) - VOLTS) R C ROCATIONS' TRAVERSE - VOLTS R C RADIAL [: E.W. - [; N.S. - [$\frac{\text{VOLTS}}{\text{VOLTS}}$ $\frac{X}{D_{eq}}$ = AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= 7.0 % INCH/UNIT Y-AXIS= 396 F.P.S./UNIT HISTOGRAMS: TO H-111: 11:1

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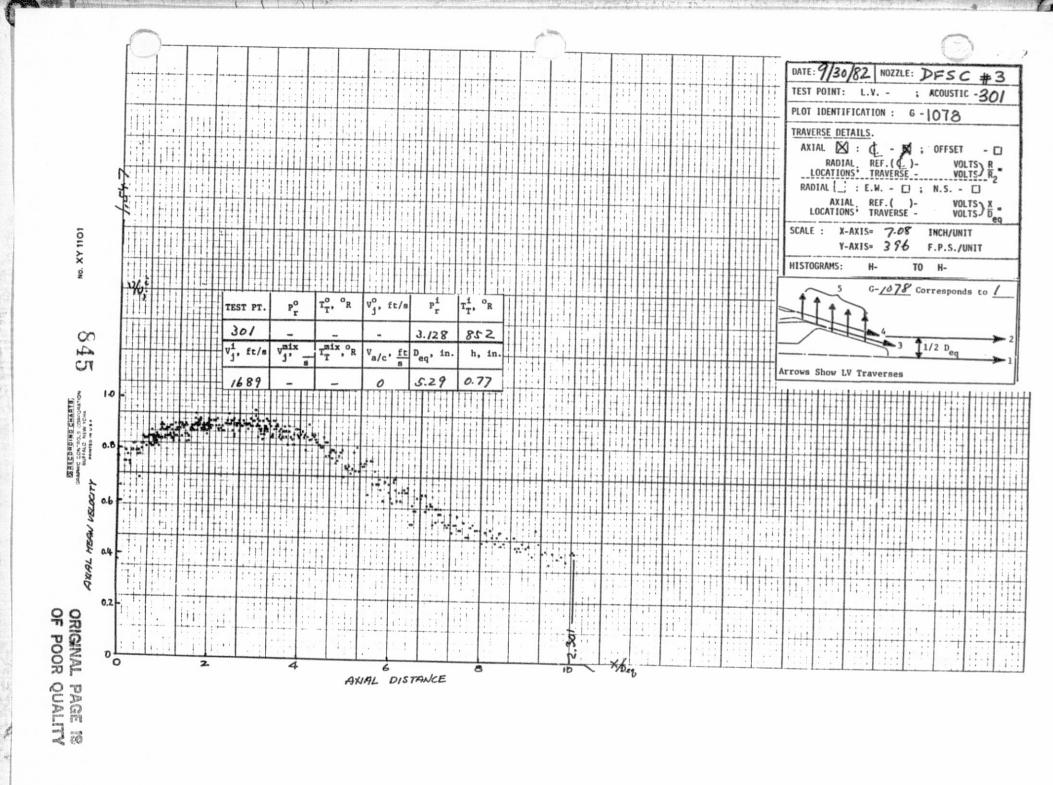
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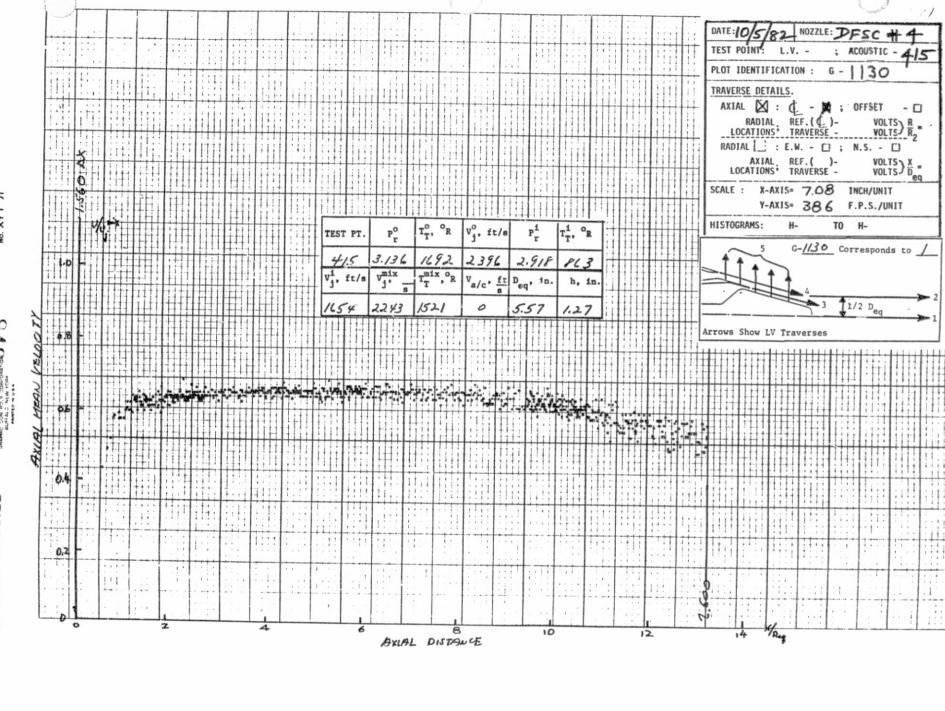
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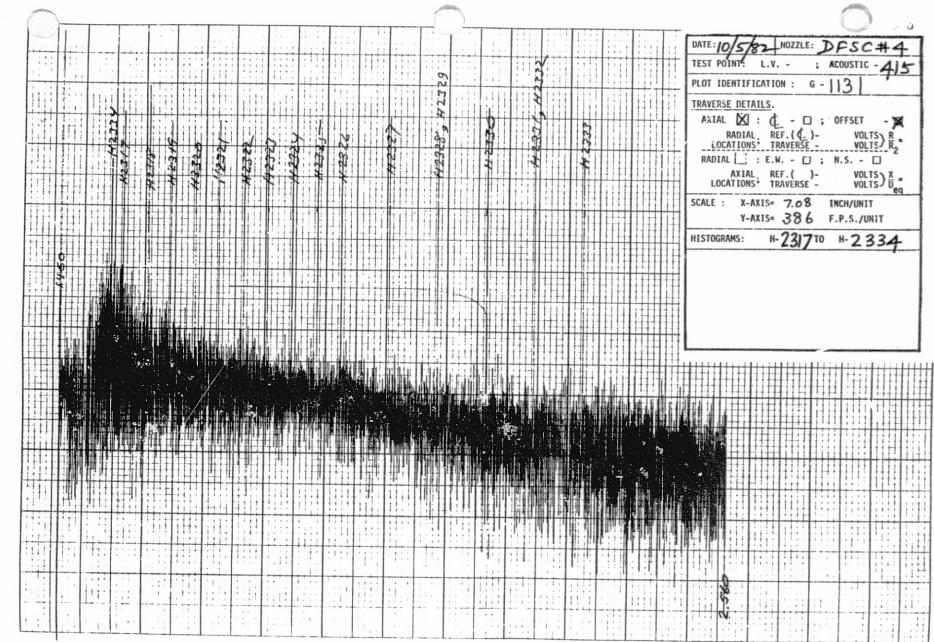
NOZZLE: DFSC 井 TEST POINT! L.V. -: ACOUSTIC -415 PLOT IDENTIFICATION : 6-1129 TRAVERSE DETAILS. AXIAL X : Q - X ; OFFSET - C RADIAL REF. (Q) - VOLTS R R LOCATIONS TRAVERSE - VOLTS R R RADIAL : E.W. - C ; N.S. - C AXIAL REF.()-LOCATIONS TRAVERSE - $\frac{\text{VOLTS}}{\text{VOLTS}}$ SCALE : X-AXIS= 7.08 INCH/UNIT 26047 Y-AXIS= 386 F.P.S./UNIT HISTOGRAMS: TO H-111 .1



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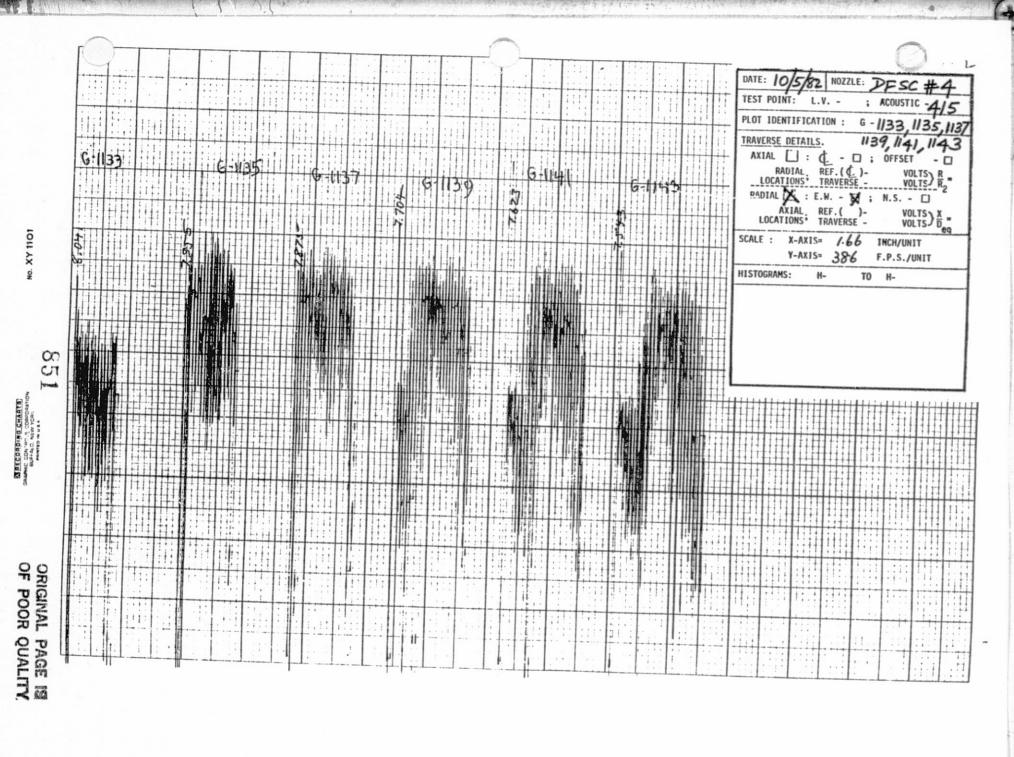
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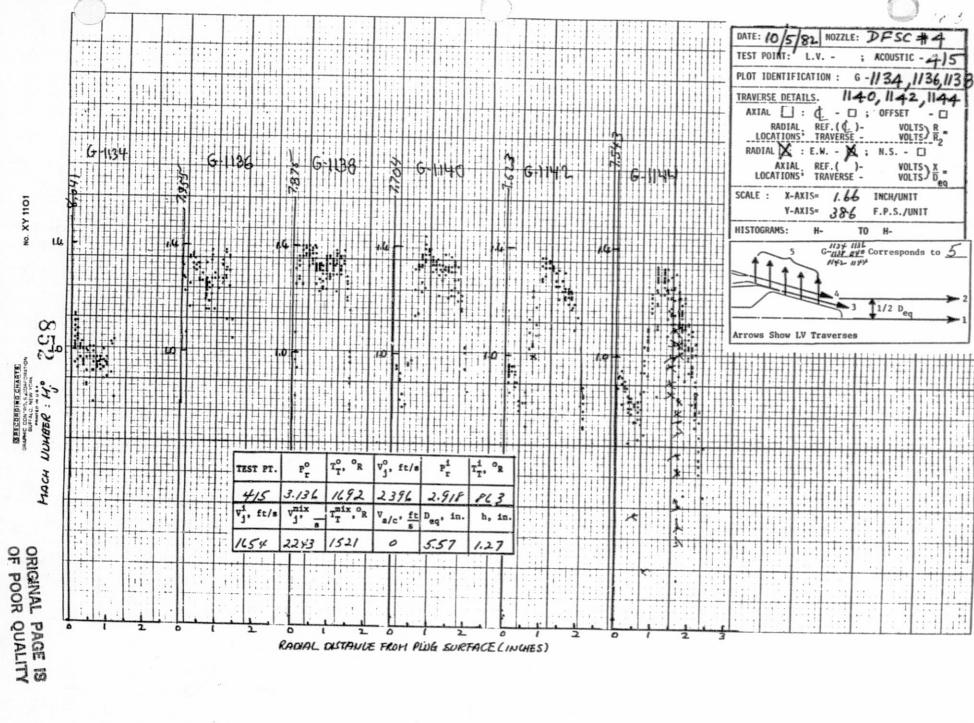
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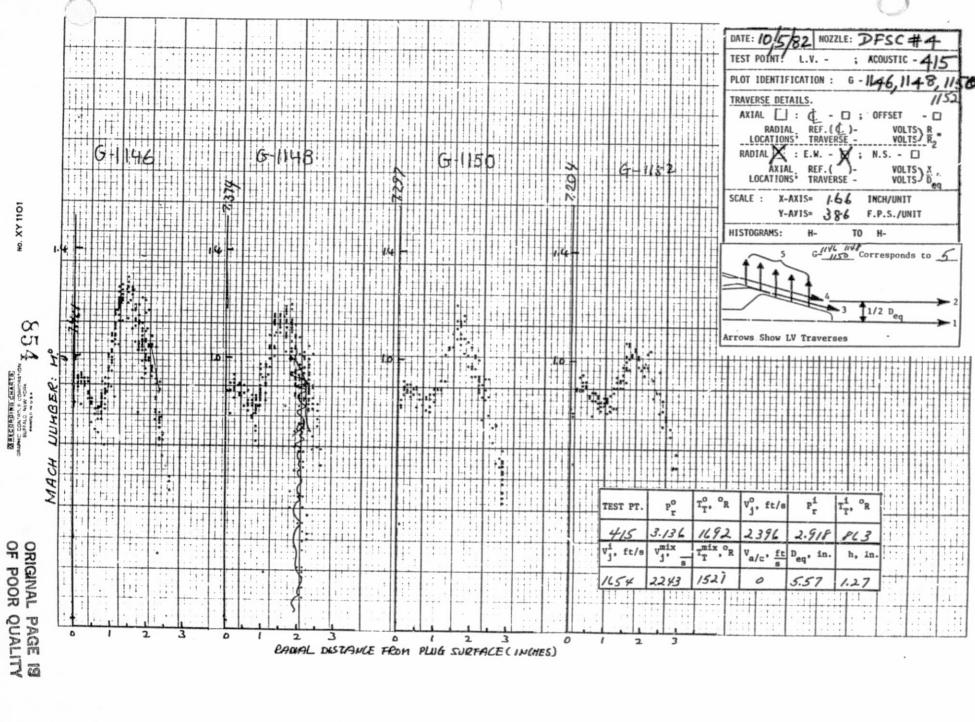
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DATE: 10 5/82 NOZZLE: DFSC
TEST POINT! L.V. - ; ACOUSTIC : ACOUSTIC -4/5 PLOT IDENTIFICATION : G-1145, 1147, 1149,115 TRAVERSE DETAILS. RADIAL REF. () - VOLTS R VOLTS R AXIAL REF. () - VOLTS R VOL G-1145 G-1147 G-1149 SCALE : X-AXIS= 1.66 INCH/UNIT 4-AXIS= 386 F.P.S./UNIT HISTOGRAMS: TO H-853 111:

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PRINTED W USA

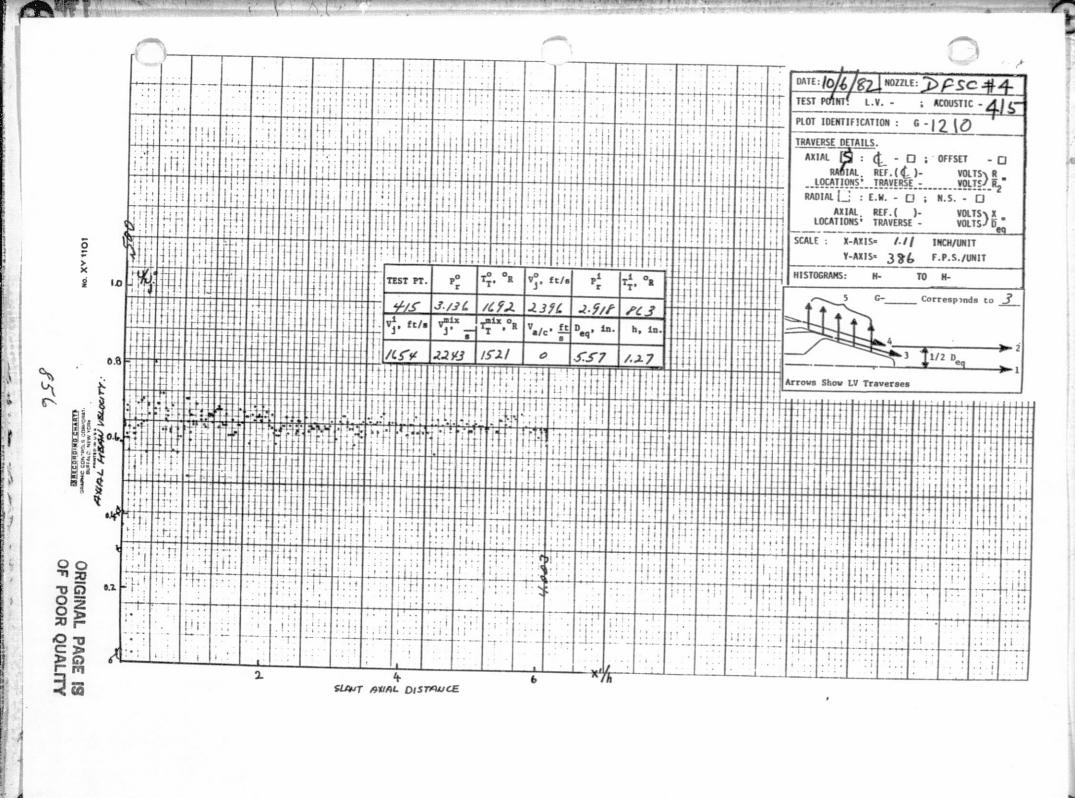
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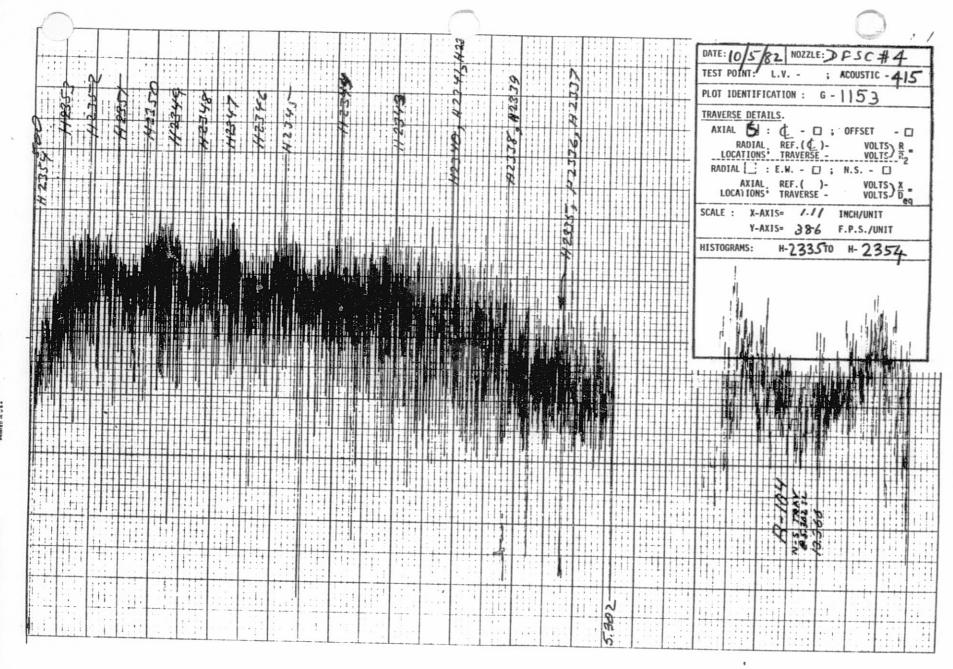
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NOZZLE: DFSC+ TEST POINT: L.V. -PLOT IDENTIFICATION : G - 1209 TRAVERSE DETAILS. AXIAL S: (-); OFFSET

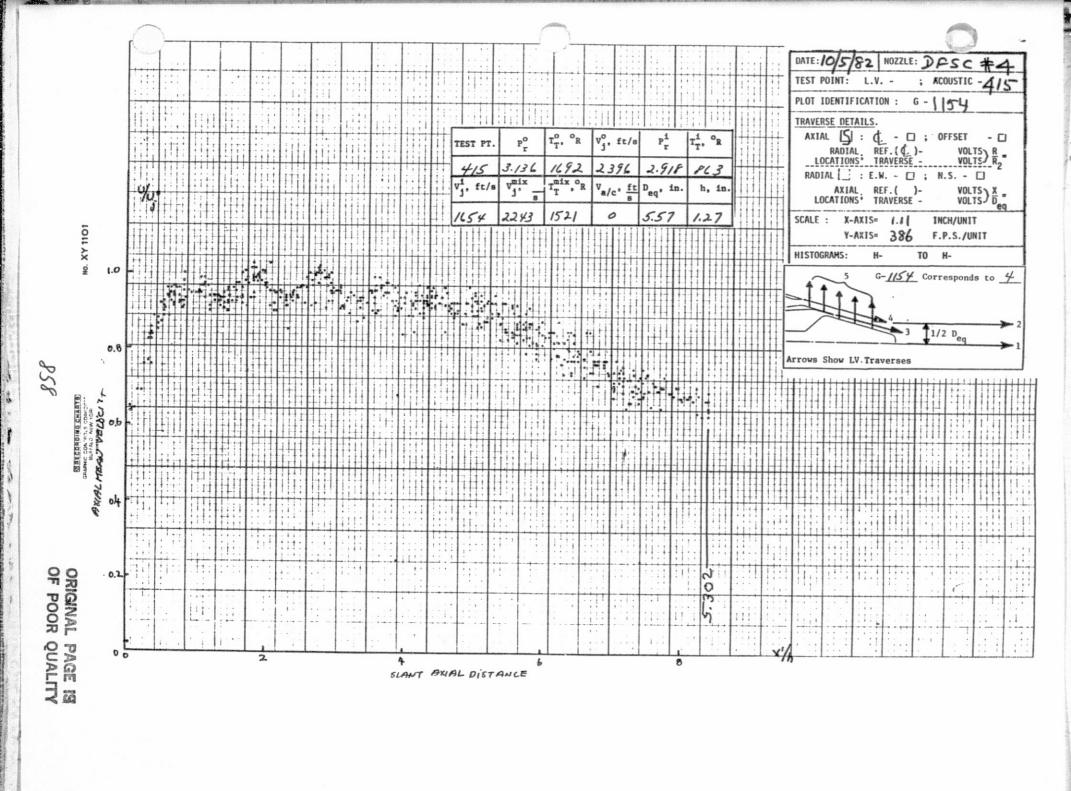
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LOCATIONS' TRAVERSE - VOL' VOLTS) R = RADIAL [: E.W. - [; N.S. - [] VOLTS) X -AXIAL REF.()-LOCATIONS: TRAVERSE -SCALE : X-AXIS= 1.61 INCH/UNIT Y-AXIS= 386 F.P.S./UNIT HISTOGRAMS: TO H-





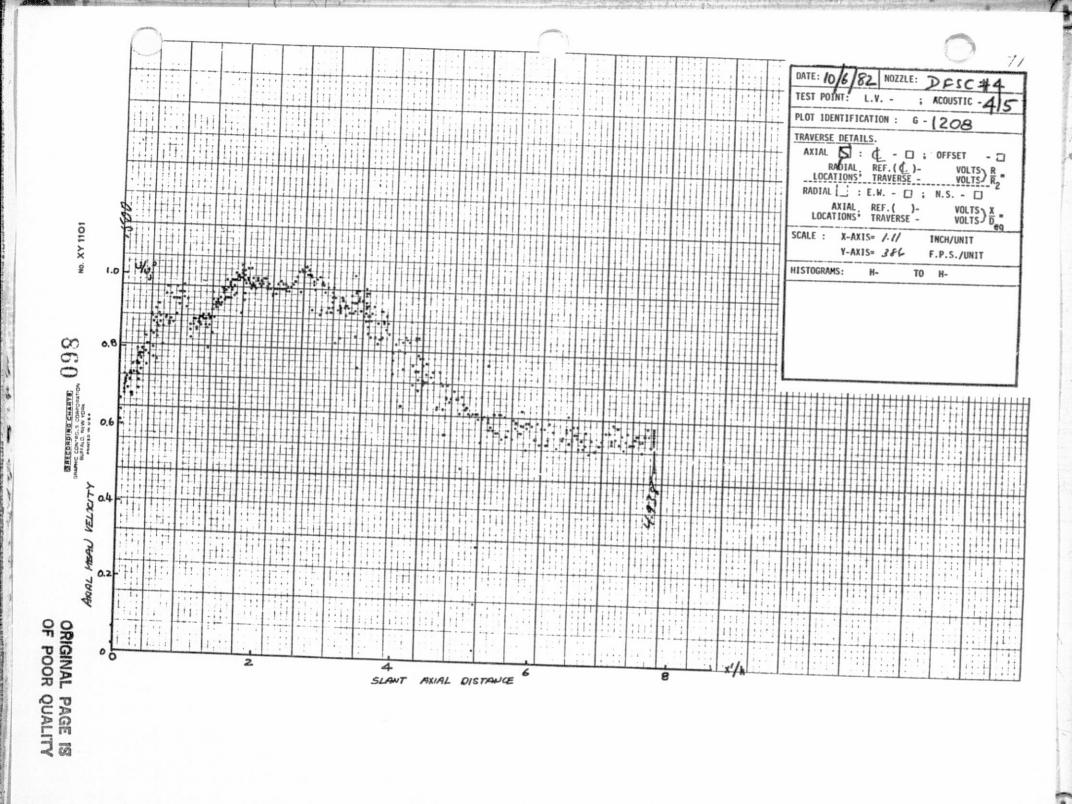
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DATE: 10/6/82 NOZZLE: DPSC#4 TEST POINT: L.V. -PLOT IDENTIFICATION : G - 12 07 TRAVERSE DETAILS. AXIAL S : C - C ; OFFSET - C RADIAL REF. (C) - VOLTS) R - LOCATIONS TRAVERSE - VOLTS R - RADIAL : E.W. - C ; N.S. - C $\frac{VOLTS}{VOLTS}$ $\frac{X}{D}$ eq AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= /.// INCH/UNIT 386 F.P.S./UNIT Y-AXIS= HISTOGRAMS: TO H-938 :!: 111

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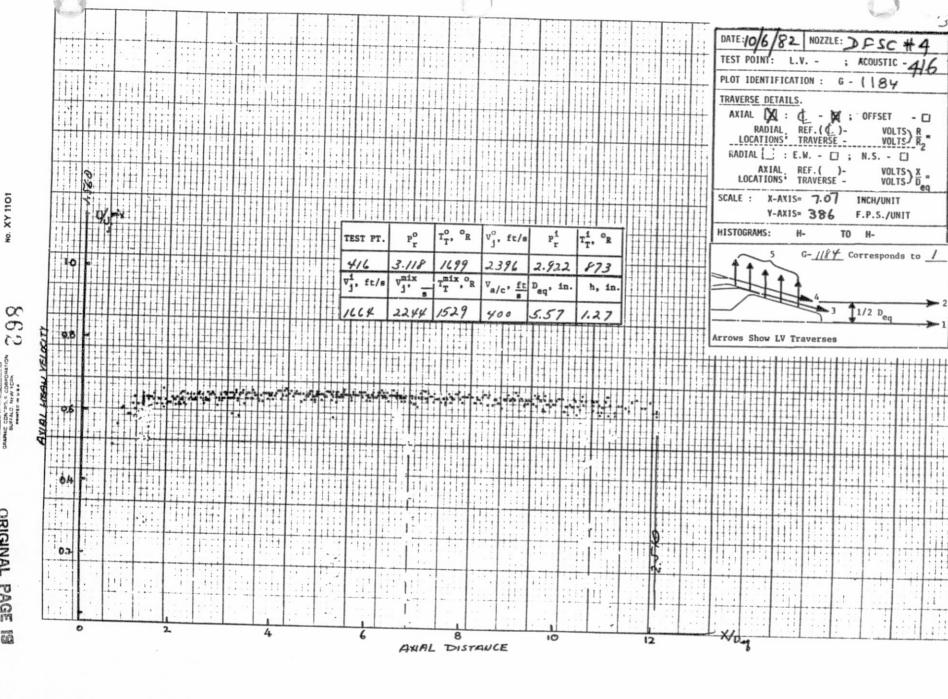


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GRAPHIC CONTONS, CORPORATION
BUFFALLS, NEW YORK
PRINTED IN U.S.

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6-1185 PLOT IDENTIFICATION : H2389 TRAVERSE DETAILS. AXIAL : (- | ; OFFSET -) RADIAL REF. (() - VOLTS) R LOCATIONS' TRAVERSE - VOLTS 42393 RADIAL [: E.W. - [; N.S. - [] $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -428,79 SCALE : X-AXIS= 7.07 INCH/UNIT Y-AXIS= 386 F.P.S./UNIT HISTOGRAMS: H- 2377T0 H-2393 863 1.385 :!: 1::

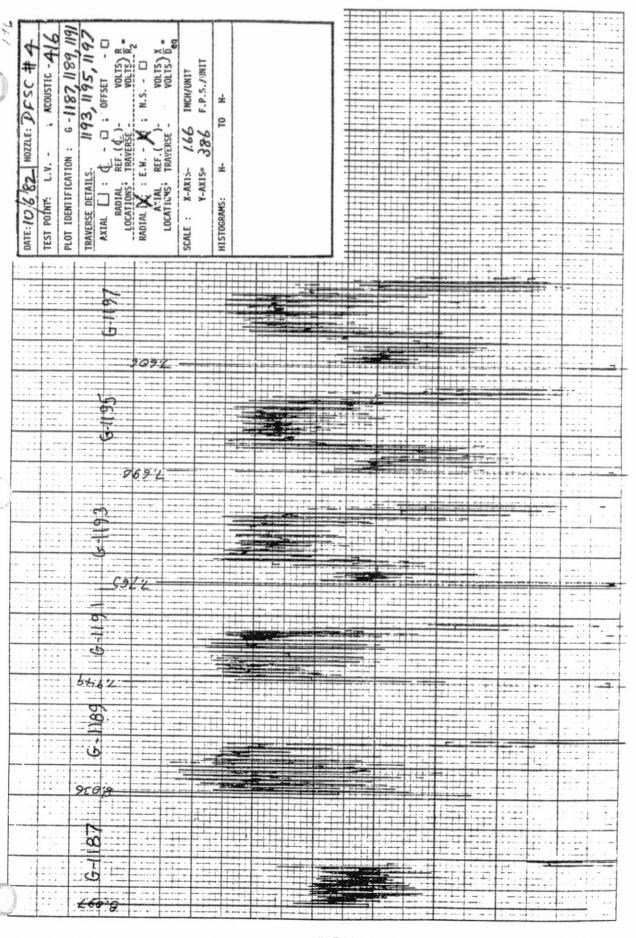
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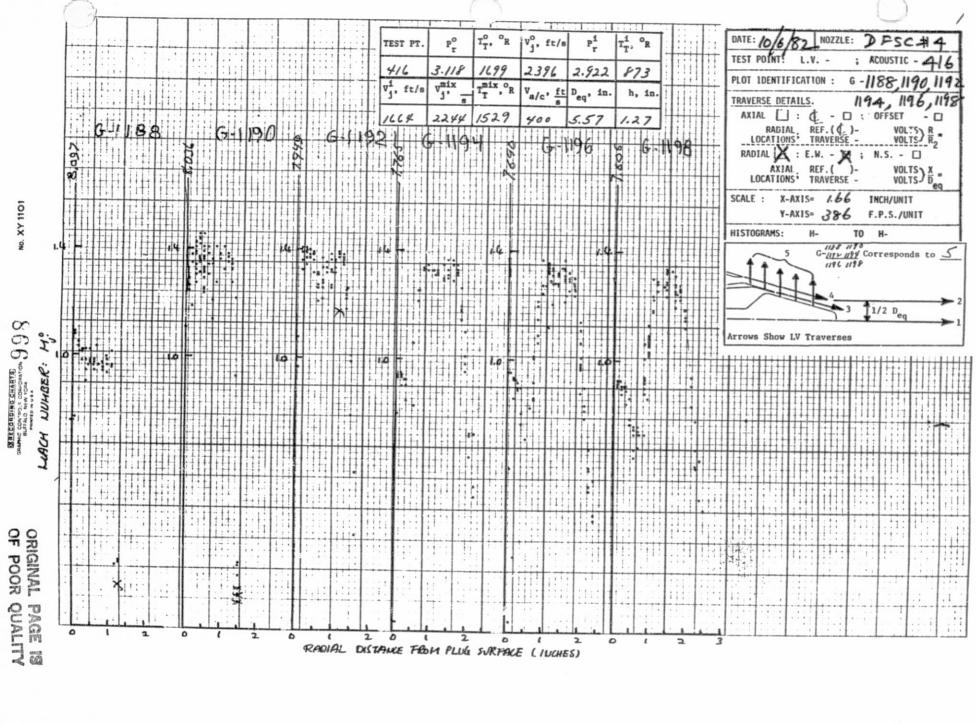
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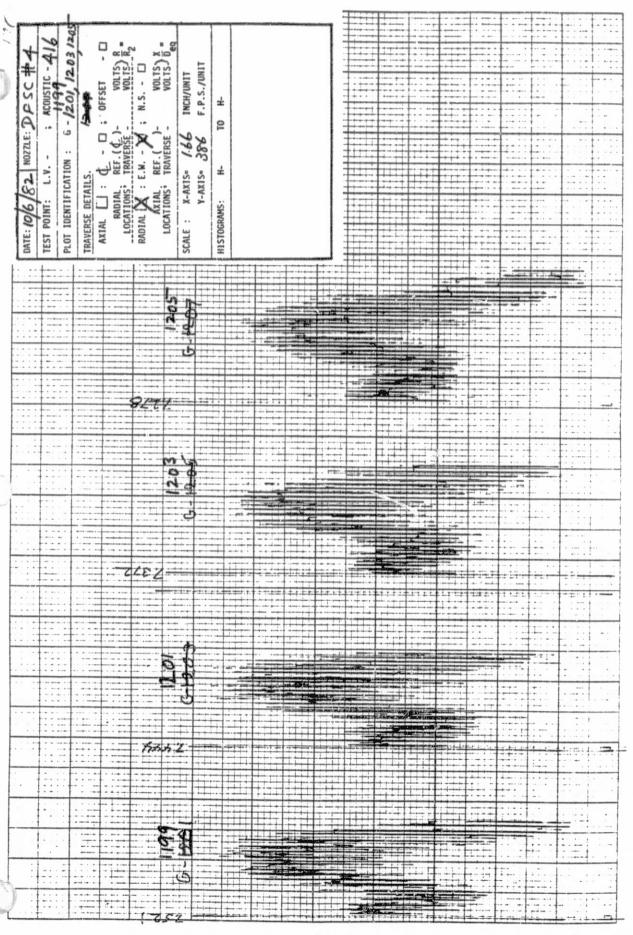
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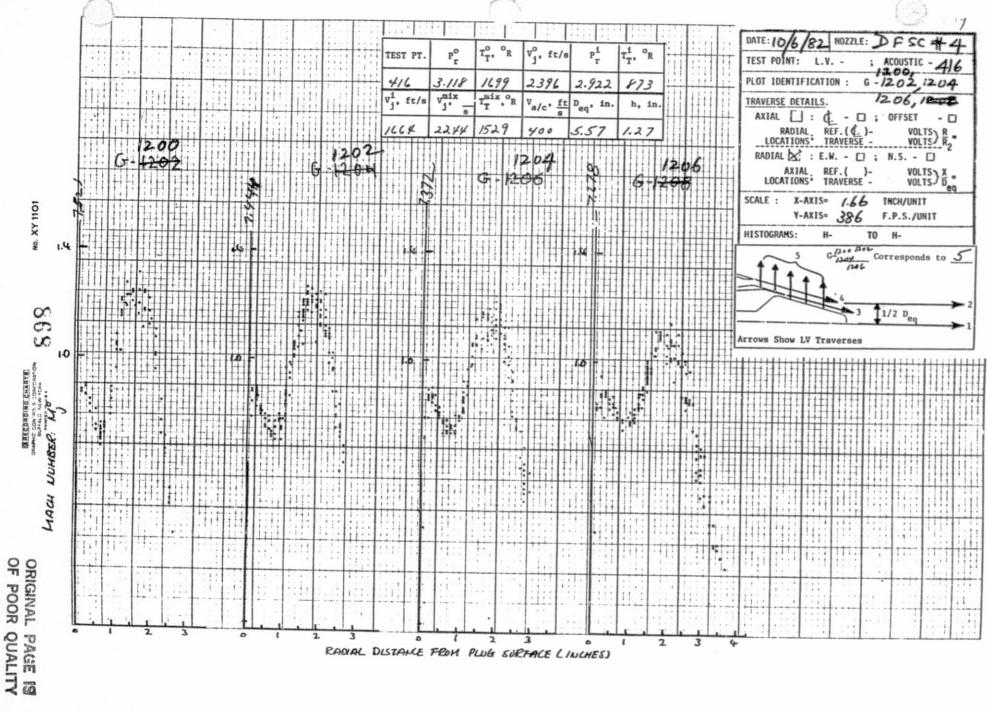
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SPARMIC CONTROLS CORPORATION
SUFFACE CONTROLS CORPORATION

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DATE: 10/7/82 MOZZLE: DFSC #4 TEST POINT: L.V. -PLOT IDENTIFICATION : G - 1227 TRAVERSE DETAILS. AXIAL SI : d - D ; OFFSET - D

RADIAL REF. (d) - VOLTS R

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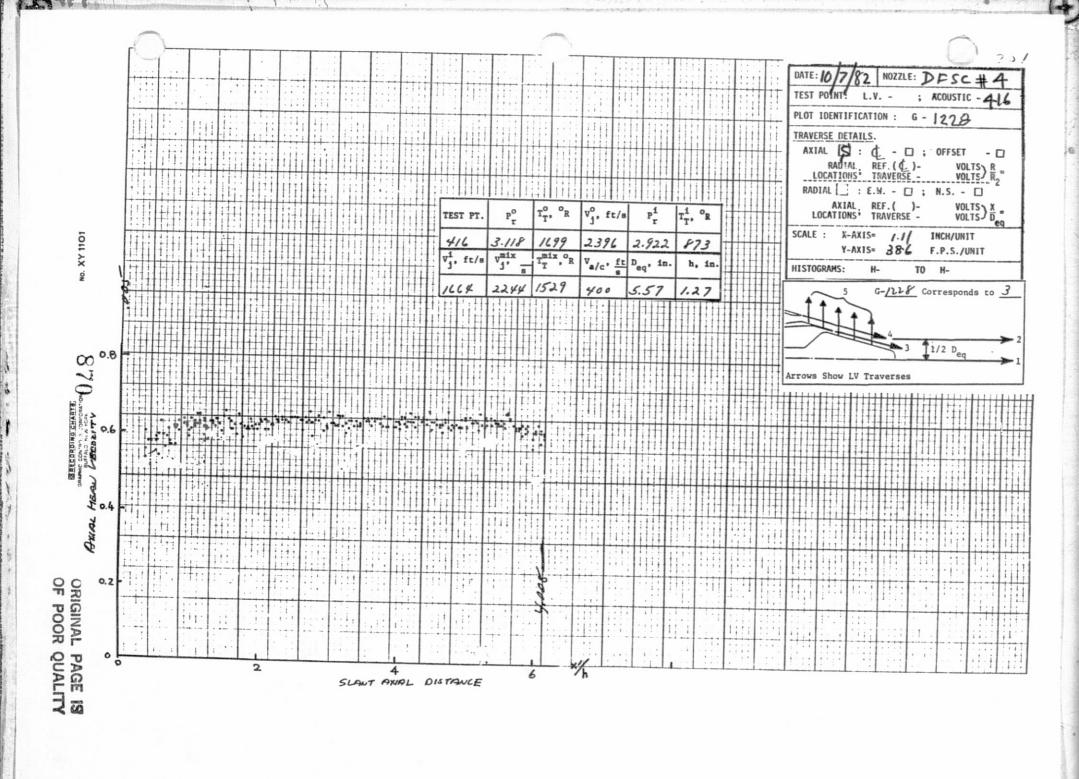
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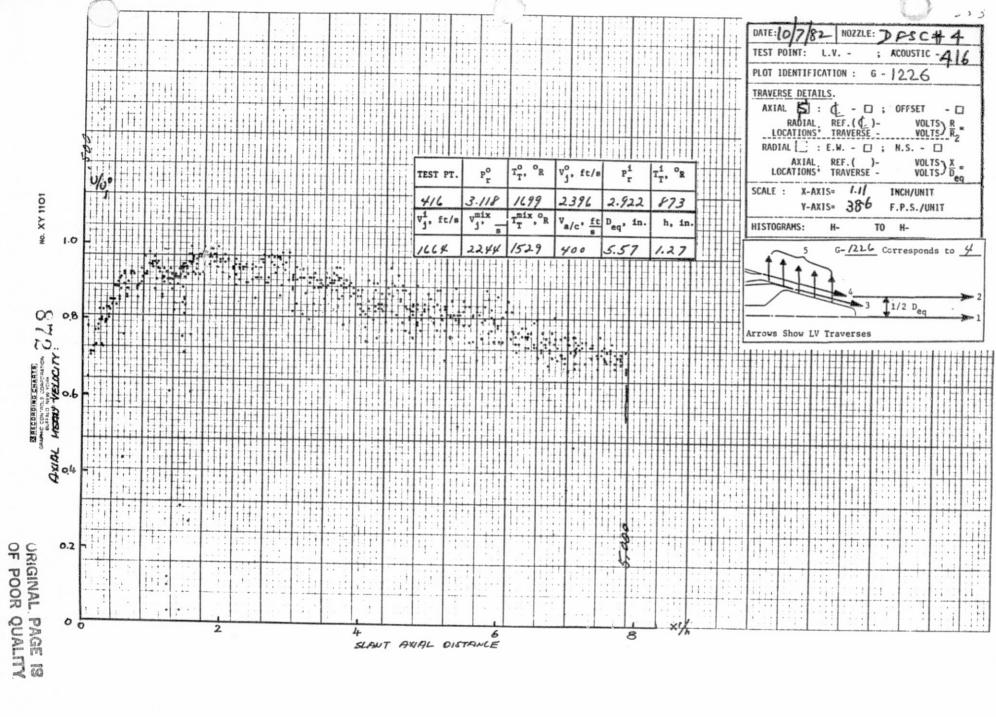
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DATE: 10/7/82 NOZZLE: : ACOUSTIC - 416 244 L.V. -6-1225 PLOT IDENTIFICATION : ¥ HIAS TRAVERSE DETAILS. AXIAL : (- | ; OFFSET - | RADIAL REF. () - VOLTS) R LOCATIONS' TRAVERSE - VOLTS R R HZYV3 #2446 14 244 $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= /.// INCH/UNIT Y-AXIS= 38-6 F.P.S./UNIT H-2434TO H- 2444 HISTOGRAMS: 1

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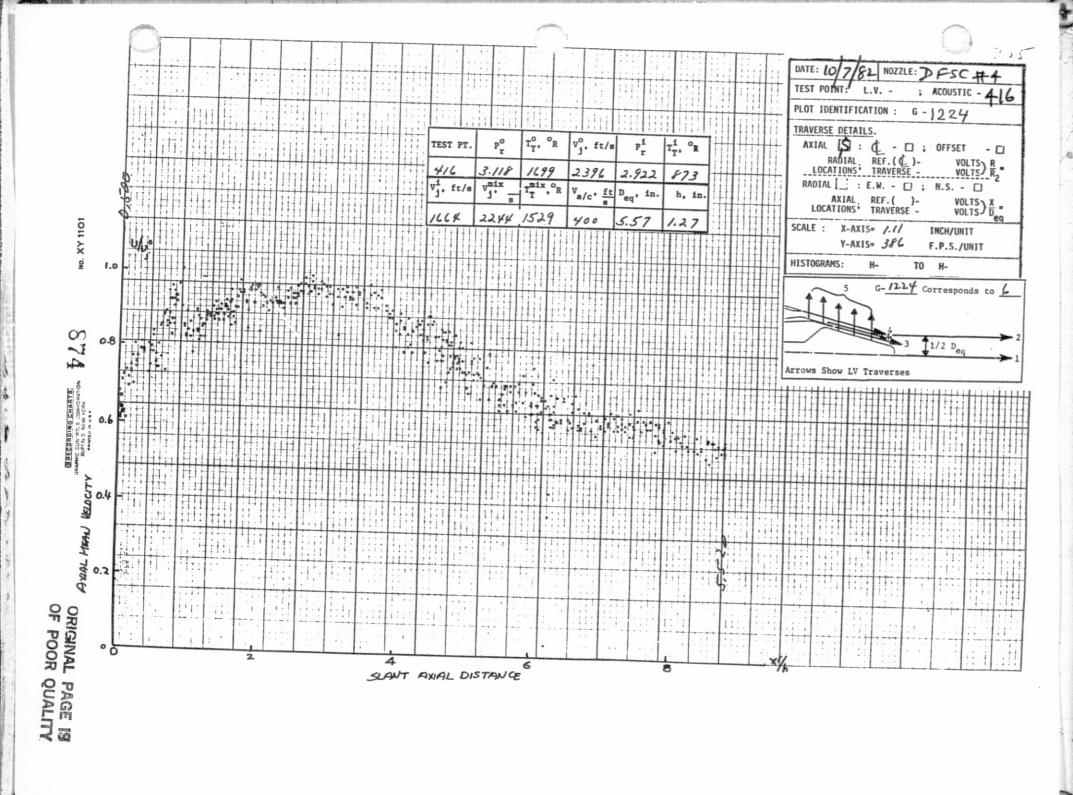
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: ACOUSTIC -416 PLOT IDENTIFICATION : G-1223 TRAVERSE DETAILS. AXIAL S: (-); OFFSET

RADIAL REF.(()- VOLTS)

LOCATIONS TRAVERSE - VOLTS

RADIAL : E.W. - : N.S. - : - 🗆 VOLTS) R . VOLTS) X = AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= /-// INCH/UNIT Y-AXIS= 386 F.P.S./UNIT HISTOGRAMS: TO H-11 : . ! :



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No. XY 1101

SECORDING CHARTS
GRAMMIC CONTROLS CORDUNATION
BUFFALL NEW YEAR
PRINTED IN U.S.A.

DATE: 10/5/82 NOZZLE: DFSC # 4 TEST POINT: L.V. - ; ACOUSTIC - [4-]

PLOT IDENTIFICATION : G-1101

TRAVERSE DETAILS.

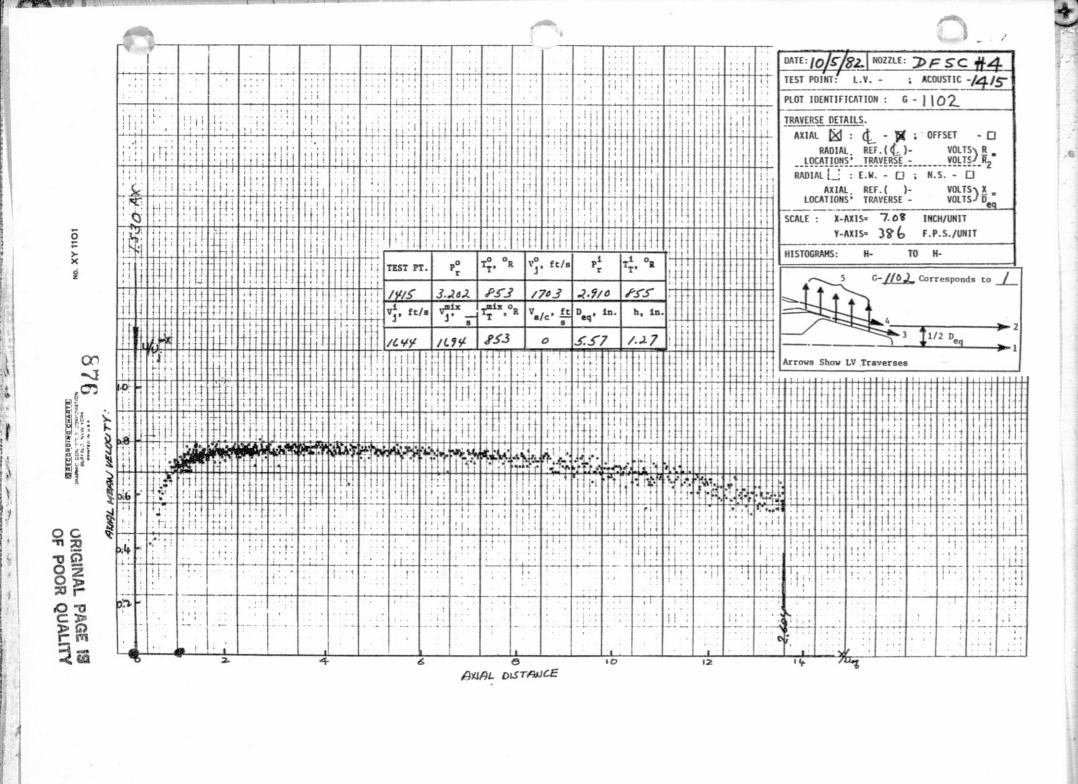
RADIAL REF. (4) - VOLTS R. LOCATIONS' TRAVERSE - VOLTS R. RADIAL . E.W. - . N.S. - .

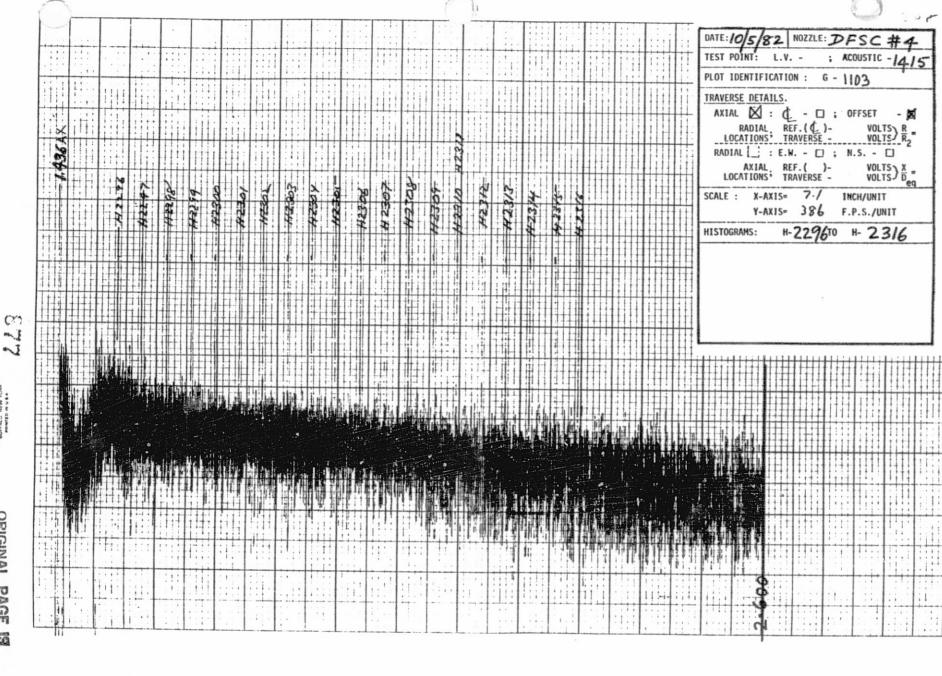
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Y-AXIS= 386 F.P.S./UNIT

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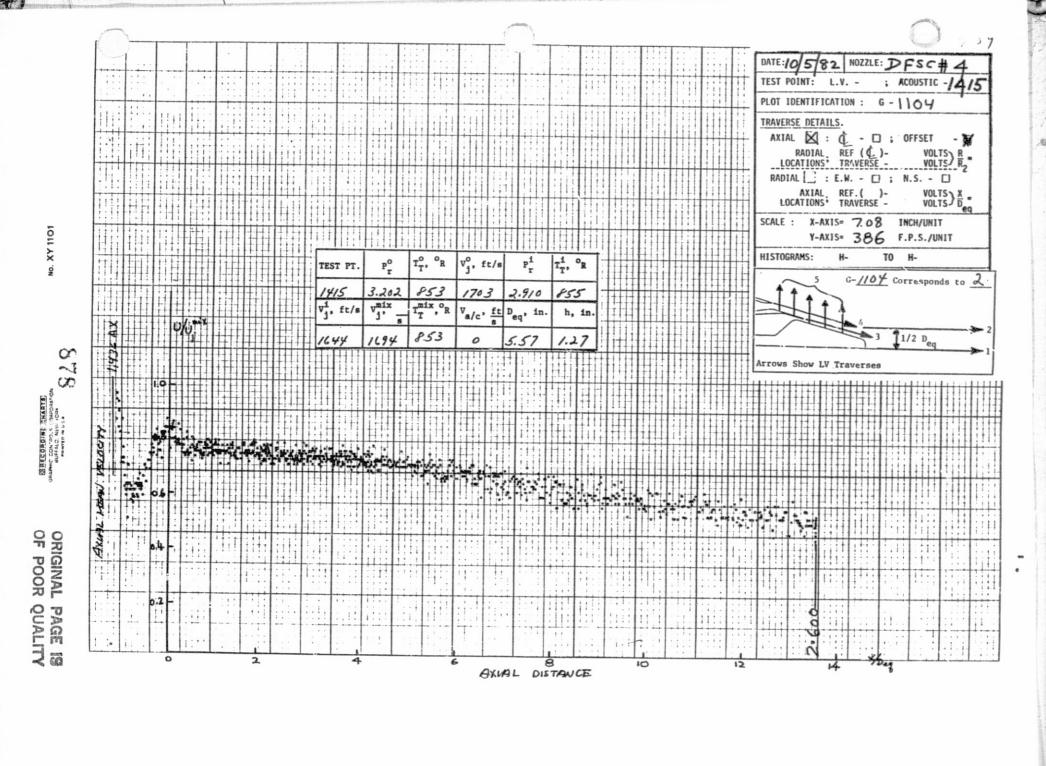
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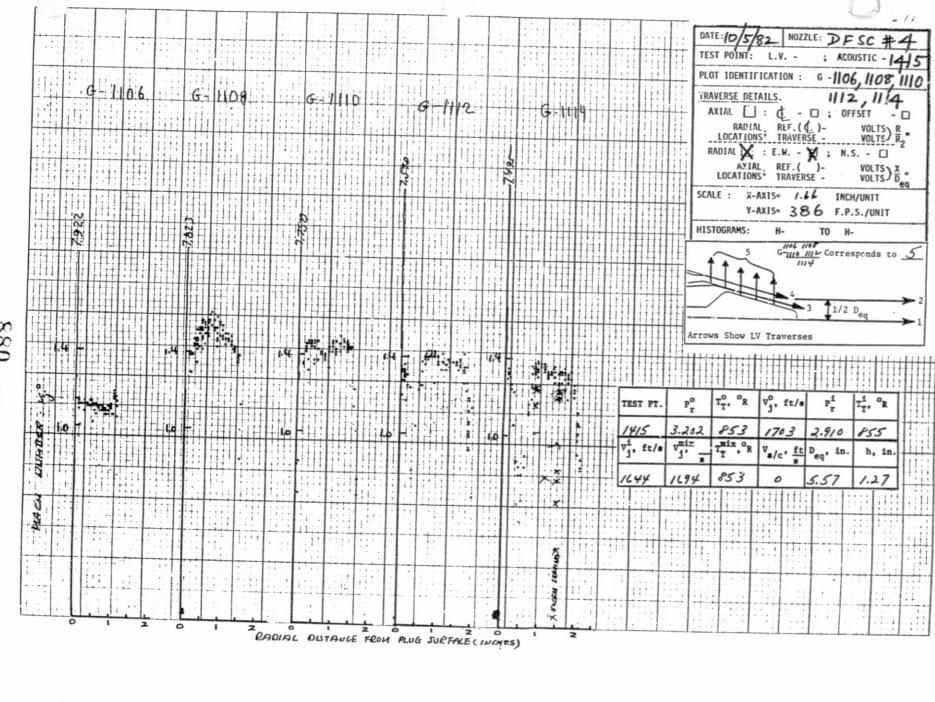
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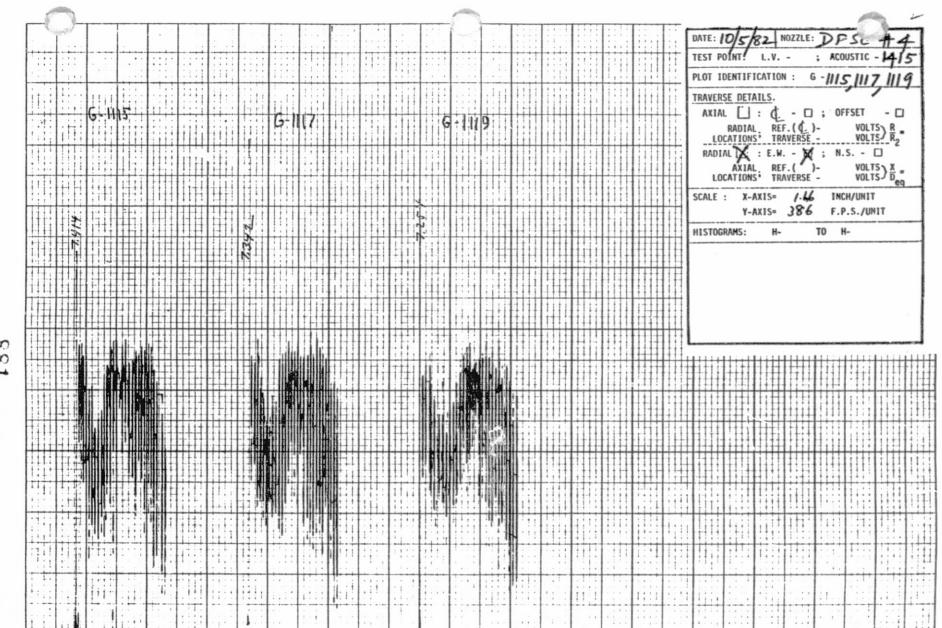
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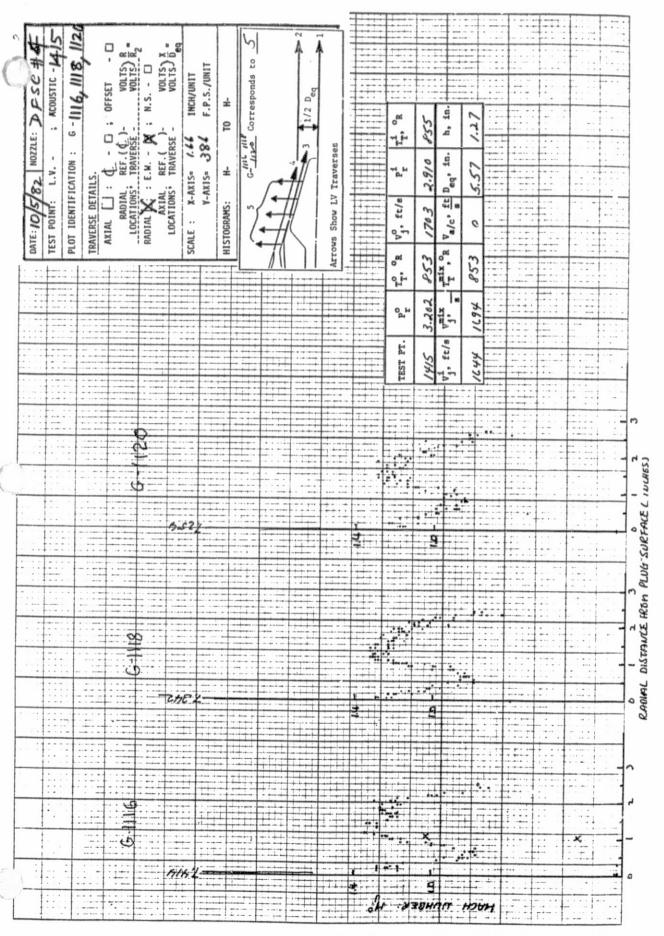
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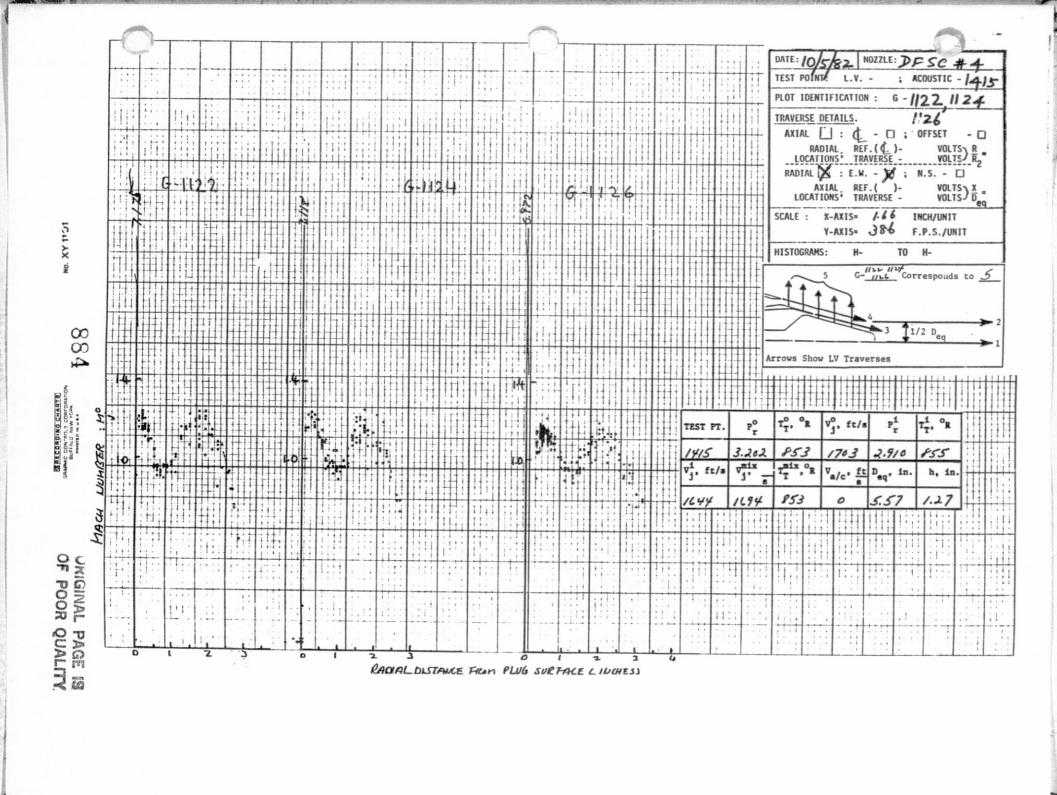


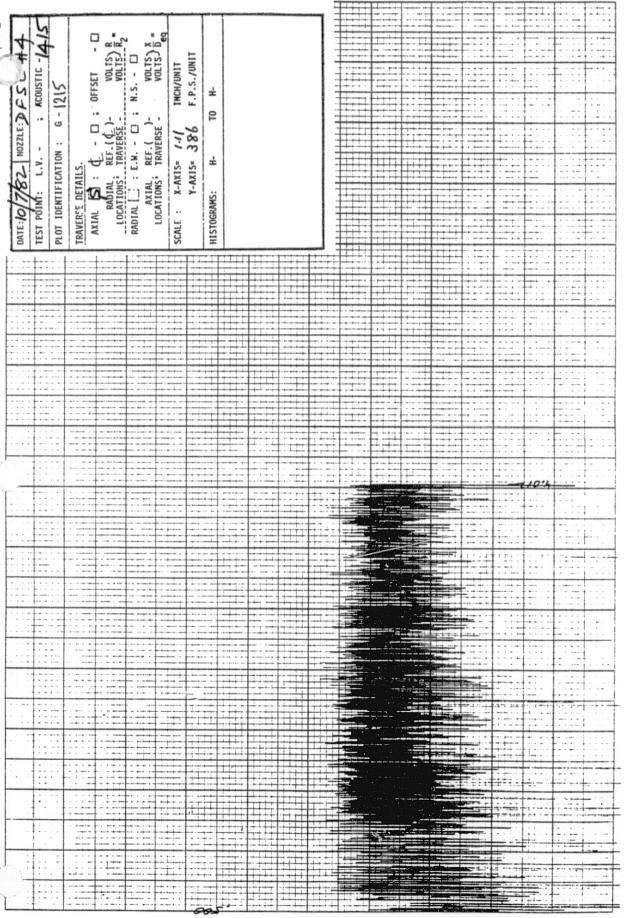
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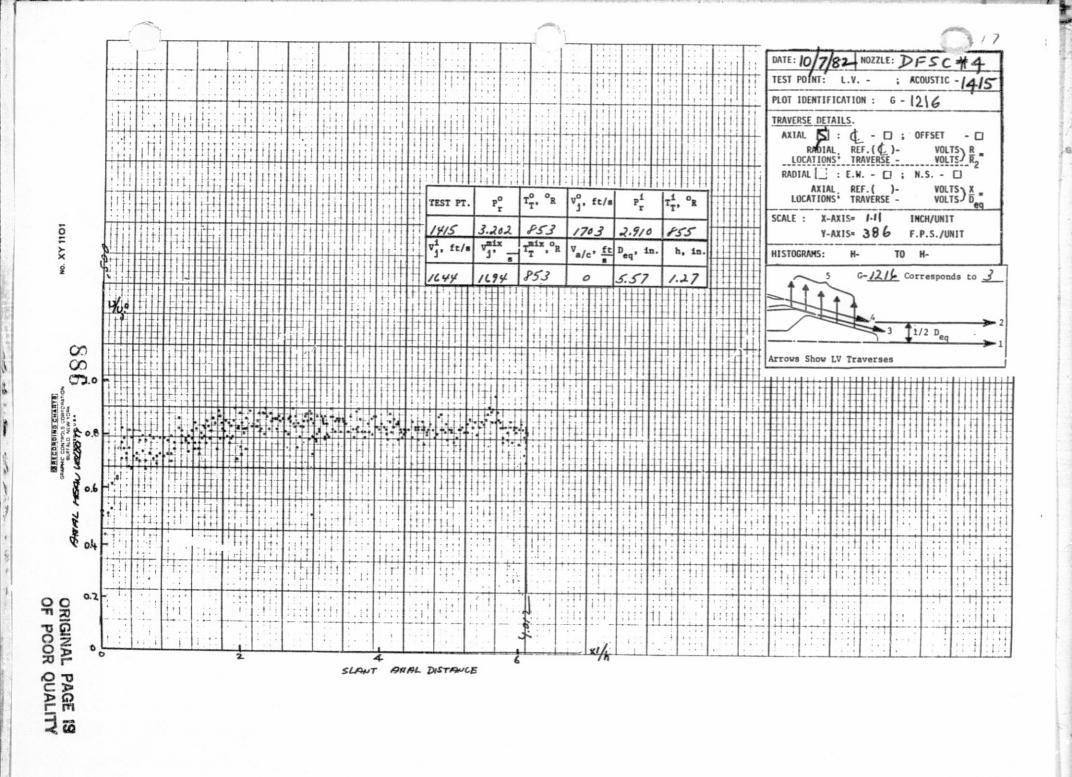
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SUFFALO, NEW YORK
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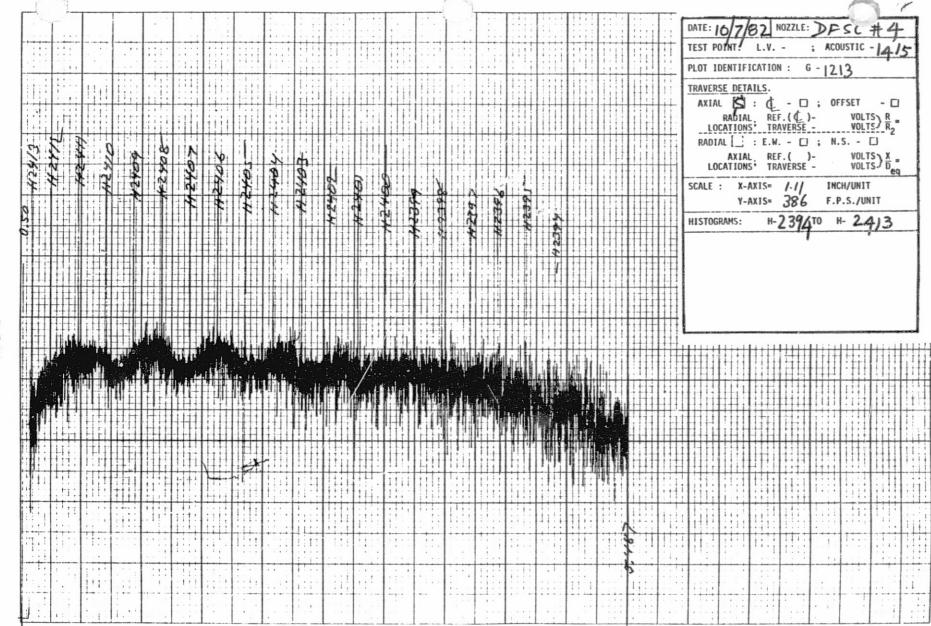
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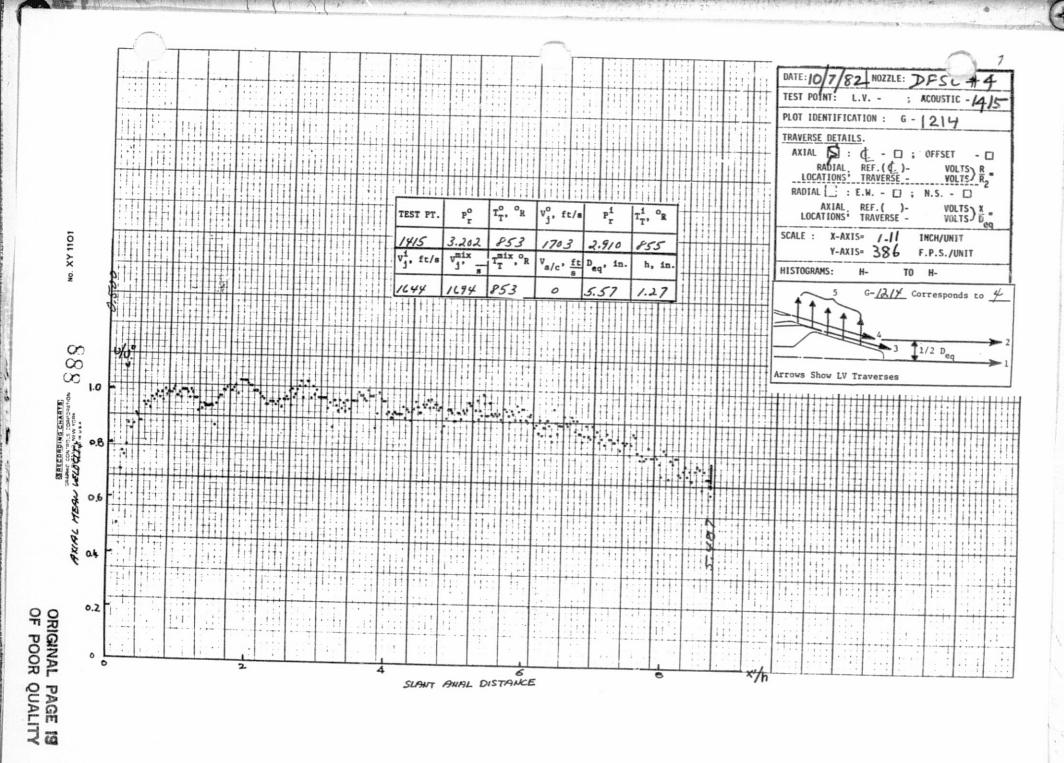


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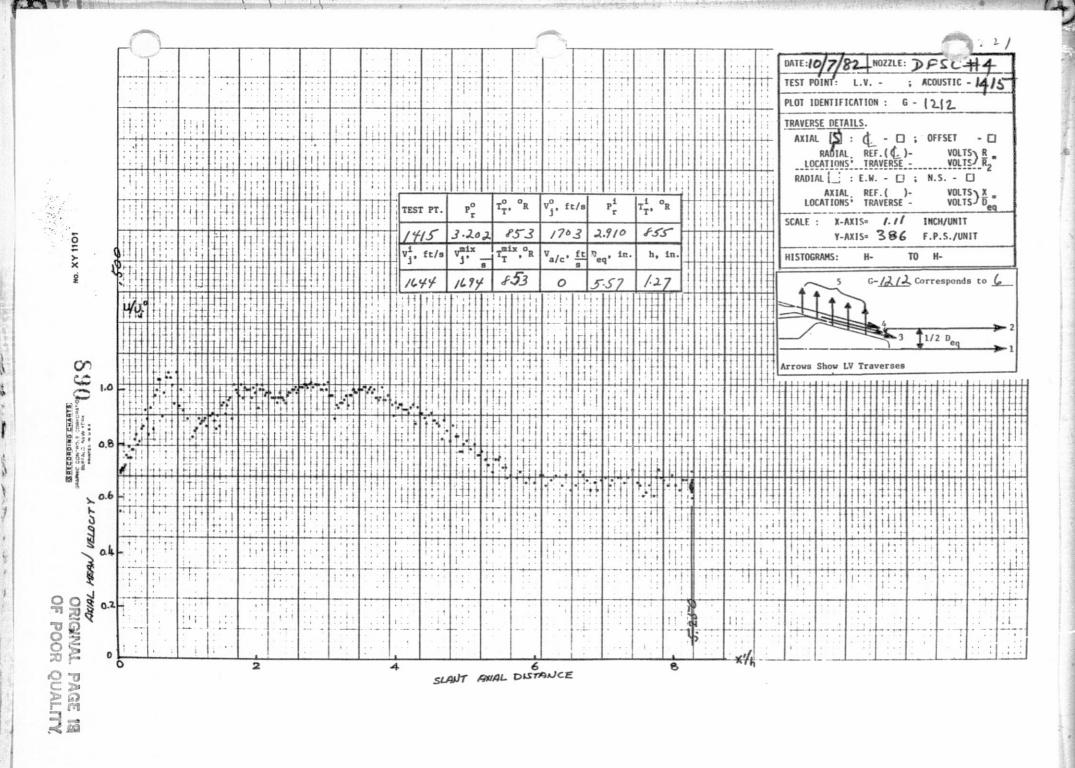
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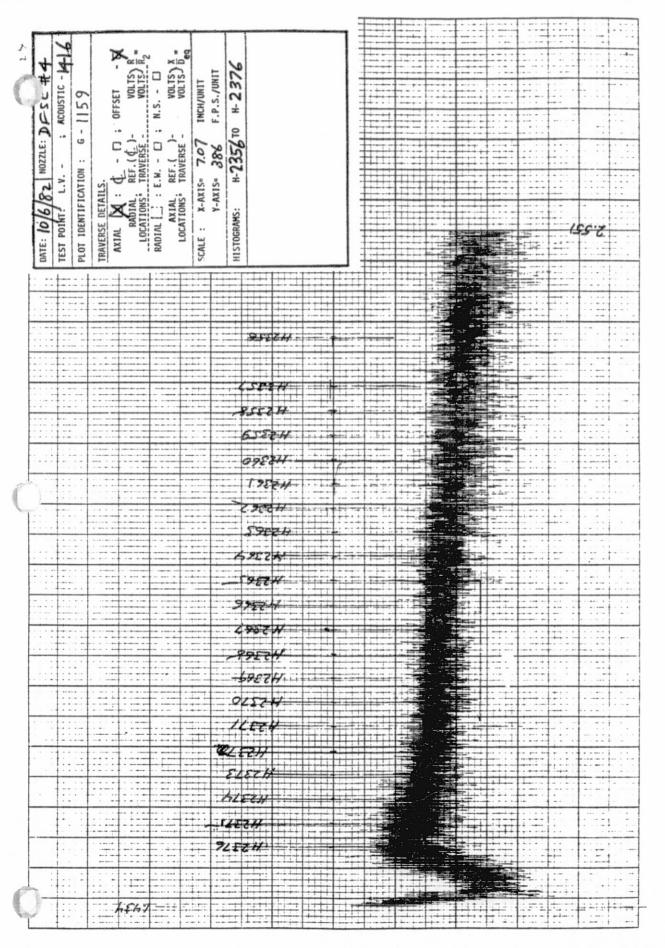
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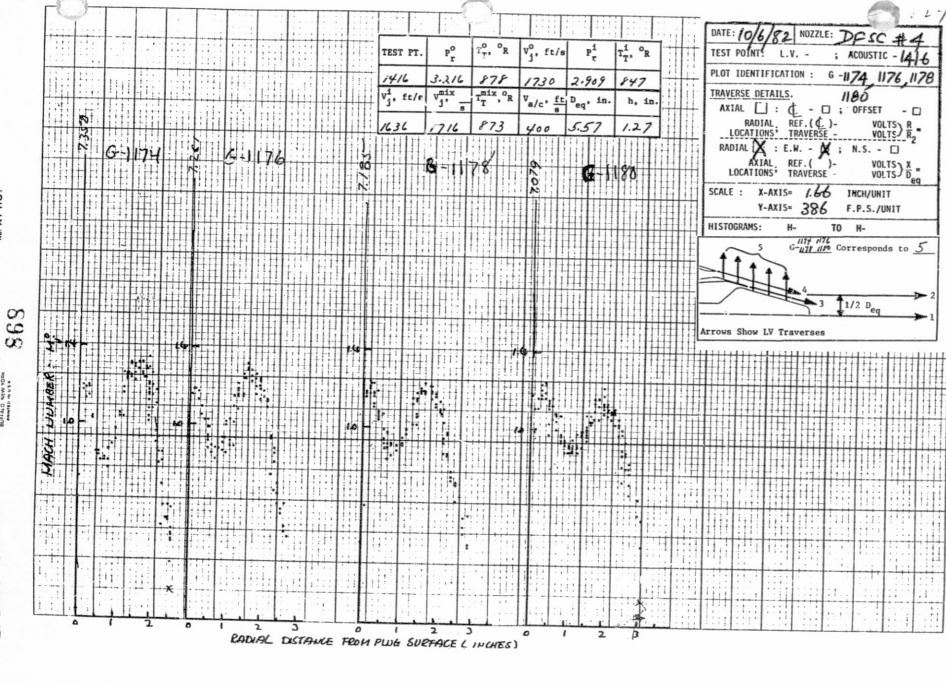
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TEST POINT! L.V. -PLOT IDENTIFICATION: 8-1173, 1175, 1177 TRAVERSE DETAILS. 20 SCALE : X-AXIS= /.66 INCH/UNIT Y-AXIS= 386 F.P.S./UNIT HISTOGRAMS: TO H-

No. XY 1101

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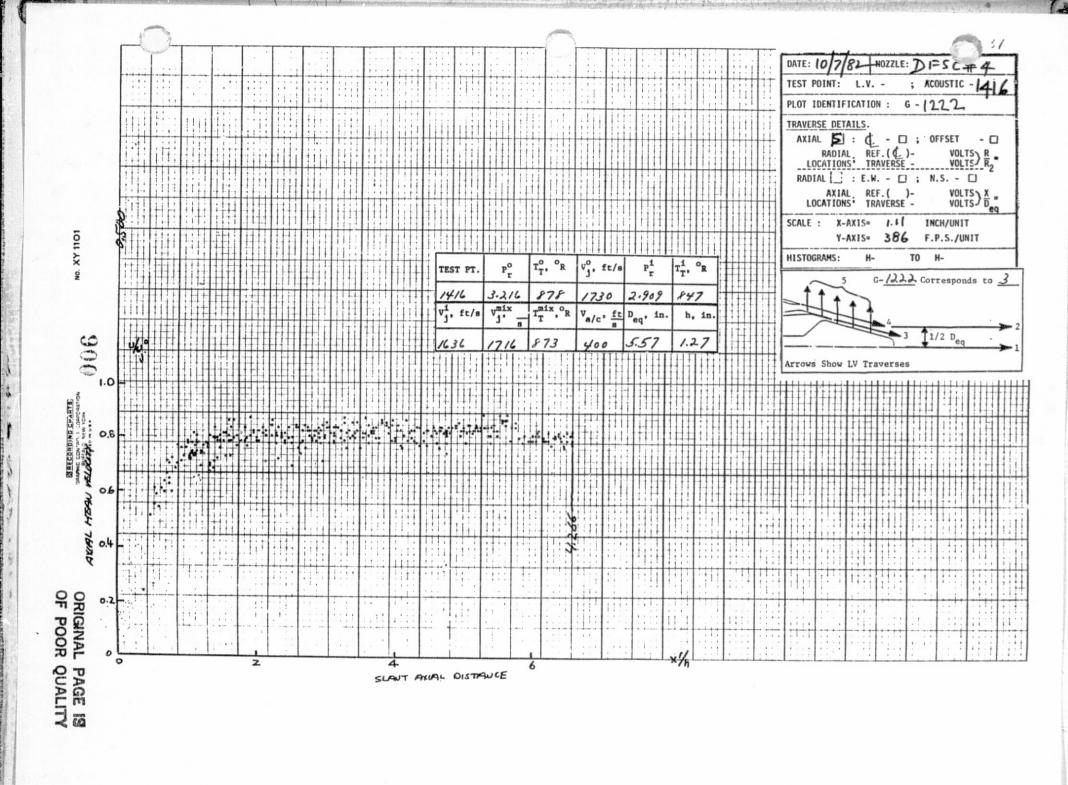


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PRINTED IN U.S.A.

No. XY 1103

DATE: 10/7/82 NOZZLE: DPS ; ACOUSTIC -1416 TEST POINT: L.V. -PLOT IDENTIFICATION : G - 1221 TRAVERSE DETAILS. AXIAL S : (- | ; OFFSET - | RADIAL REF. (() - VOLTS) R ... LOCATIONS' TRAVERSE - VOLTS R ... RADIAL [] : E.W. - [] ; N.S. - [] VOLTS) X = AXIAL, REF.()-LOCATIONS' TRAVERSE -SCALE : X-AXIS= iff INCH/UNIT Y-AXIS= 3.86 F.P.S./UNIT HISTOGRAMS: TO H-

XY 1101



DATE: 10/7/82 NOZZLE: PFSC #4 ; ACOUSTIC - 1416 TEST POINT: L.V. -PLOT IDENTIFICATION : 6 - 1219 TRAVERSE DETAILS. AXIAL B : (-); OFFSET

RADIAL REF.(()- VOL.

LOCATIONS' TRAVERSE - VOL. VOLTS) R ... RADIAL [: E.W. - [] ; N.S. - [] $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= /-// INCH/UNIT 4343 H2426 Y-AXIS= 386 112425 F.P.S./UNIT 242 H-24/4 TO HISTOGRAMS: H-2433 11: 1 · 1

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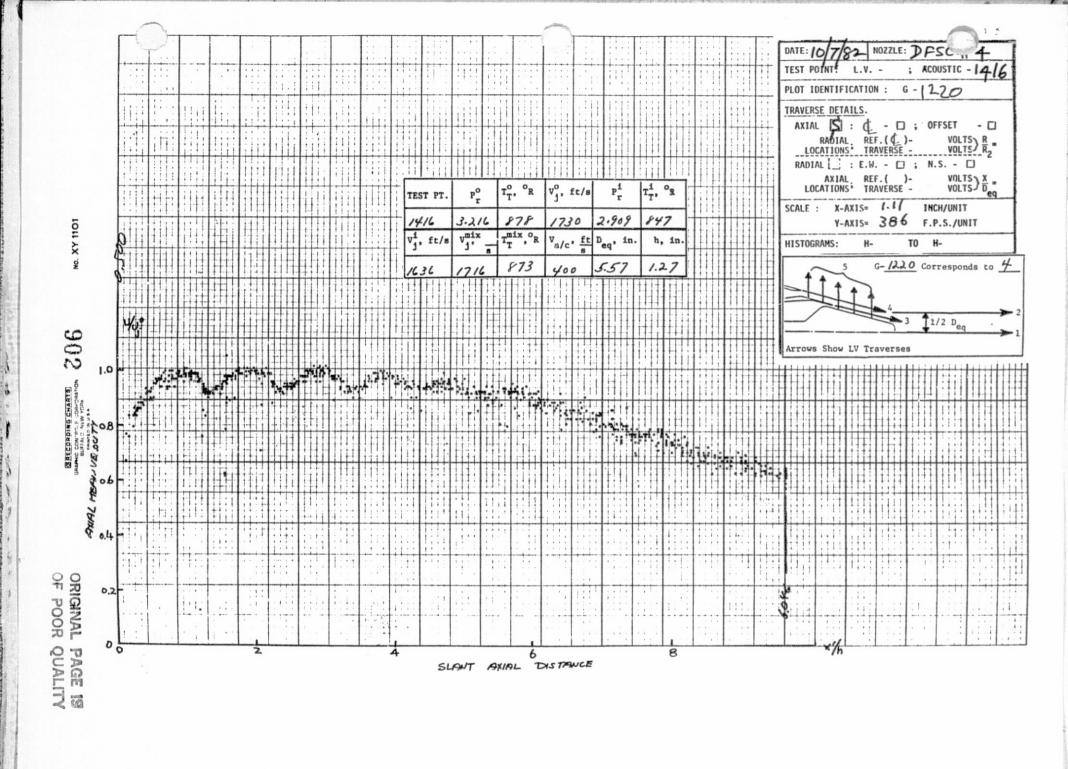
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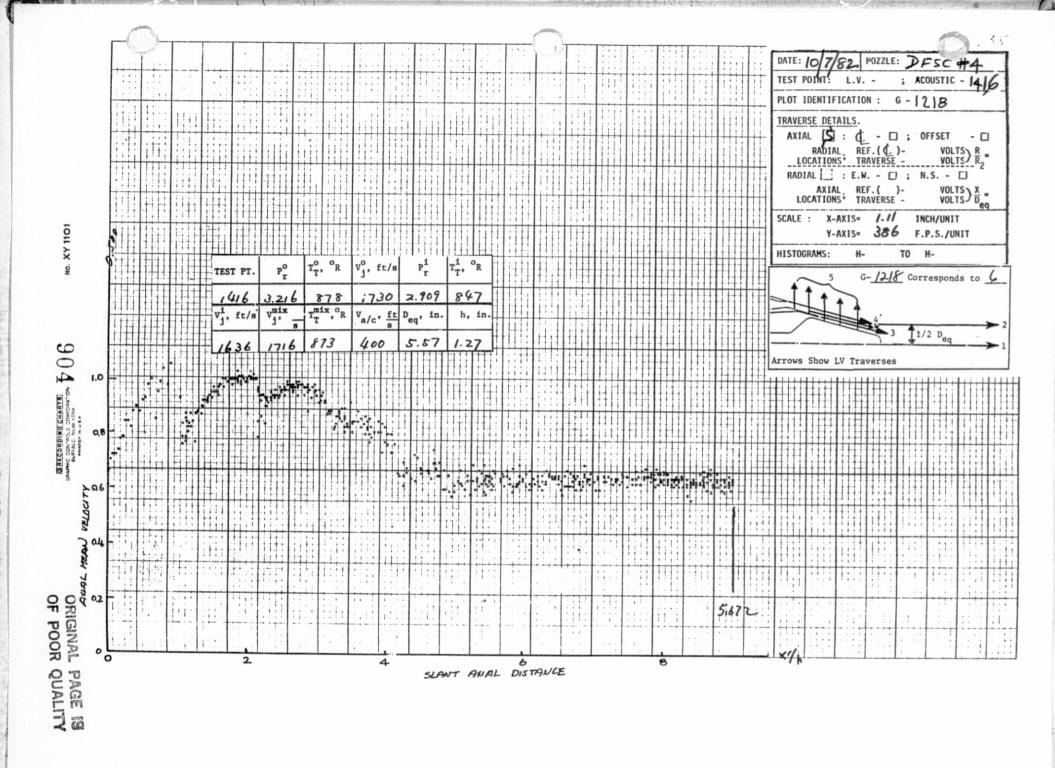
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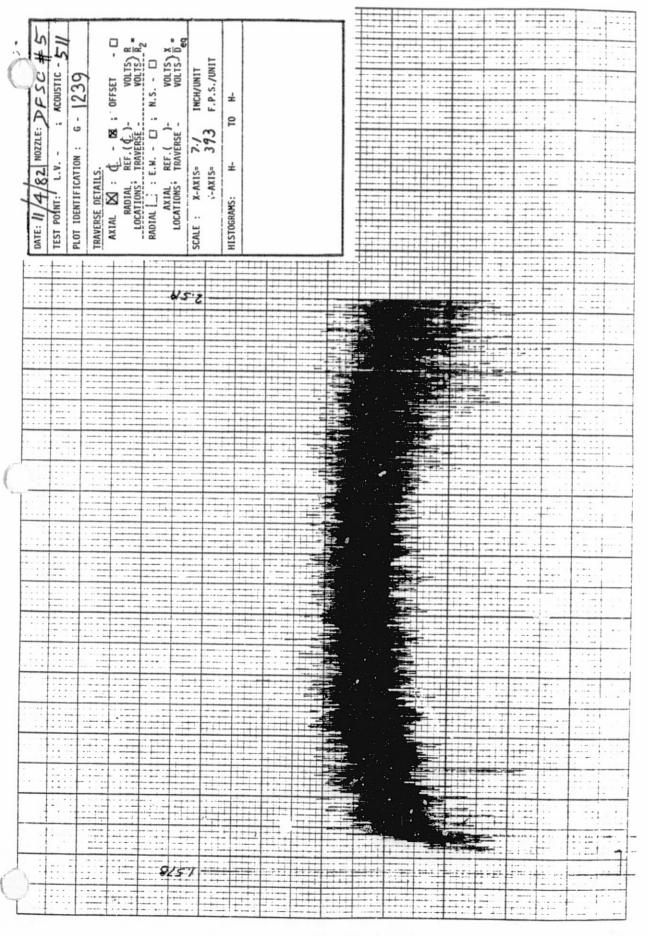
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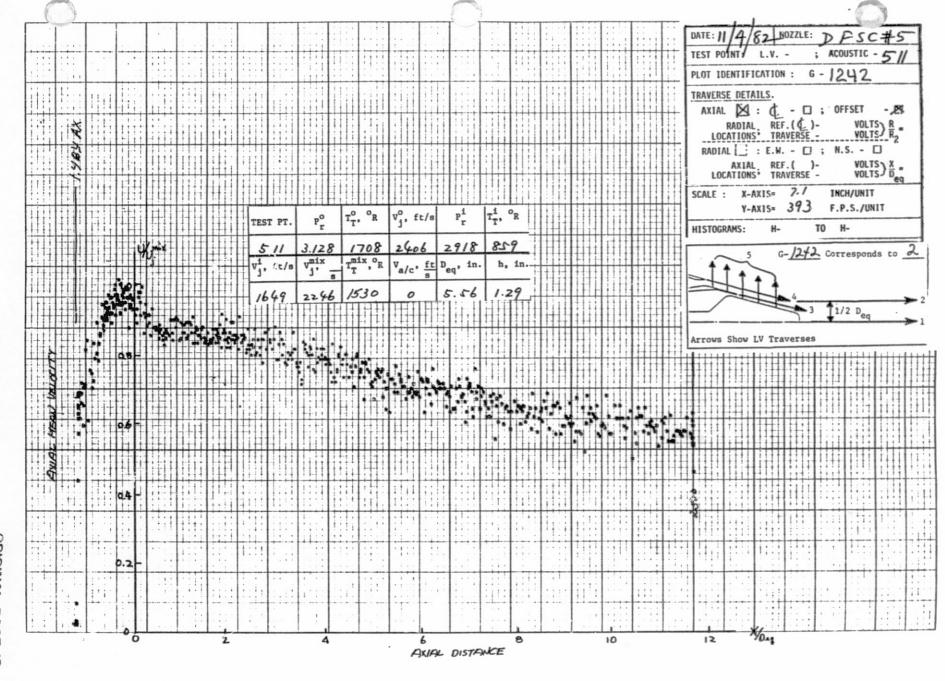


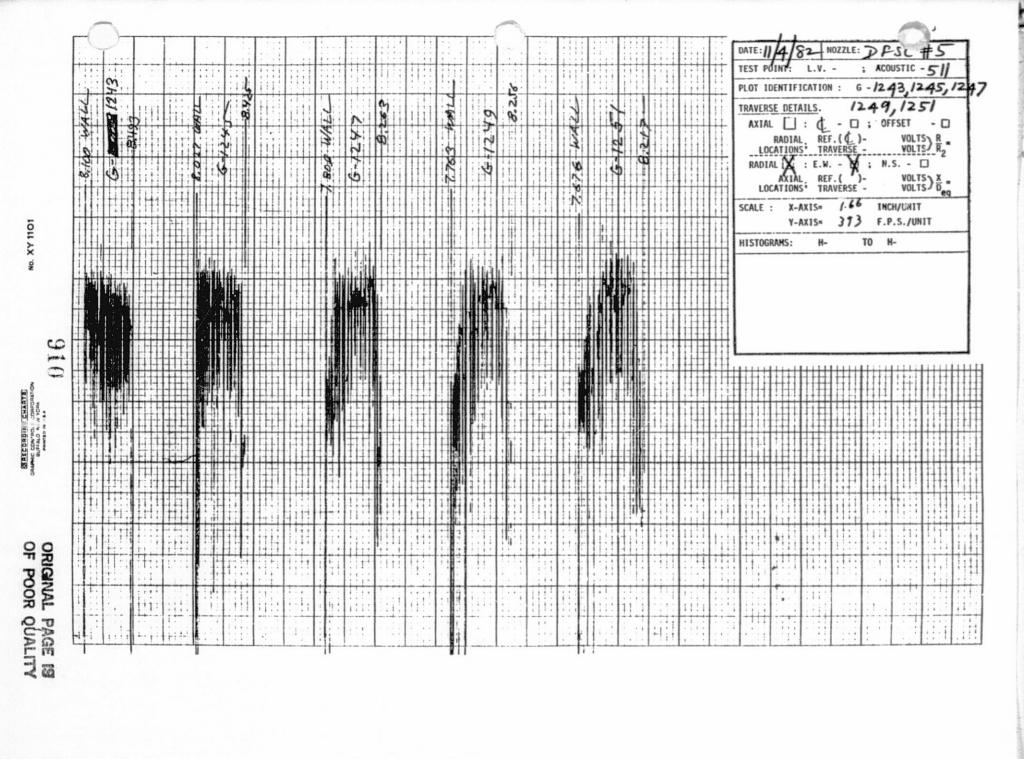
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82 NOZZLE: DFSC#5

1.66 INCH/UNIT

TO H-

F.P.S./UNIT

Y-AXIS= 393

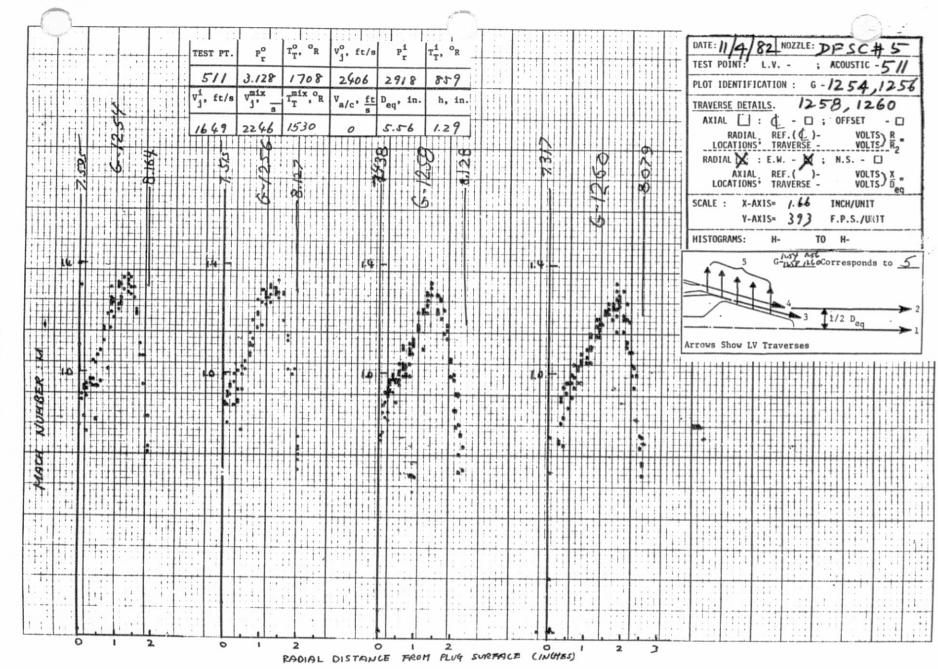
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TEST POINT! L.V. -

PLOT IDENTIFICATION :

TRAVERSE DETAILS.

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777 TRAVERSE DETAILS.

AXIAL [\$\overline{\mathcal{L}} : 0 \text{ of FSET } - \overline{\mathcal{L}} \text{ NOLTS} \) Rabial. Ref. (\$\overline{\mathcal{L}} : 0 \text{ of FSET } - \overline{\mathcal{L}} \) VOLTS \) Rabial. Ref. (\$\overline{\mathcal{L}} : \overline{\mathcal{L}} DESC# 6-1567 PLOT IDENTIFICATION TEST

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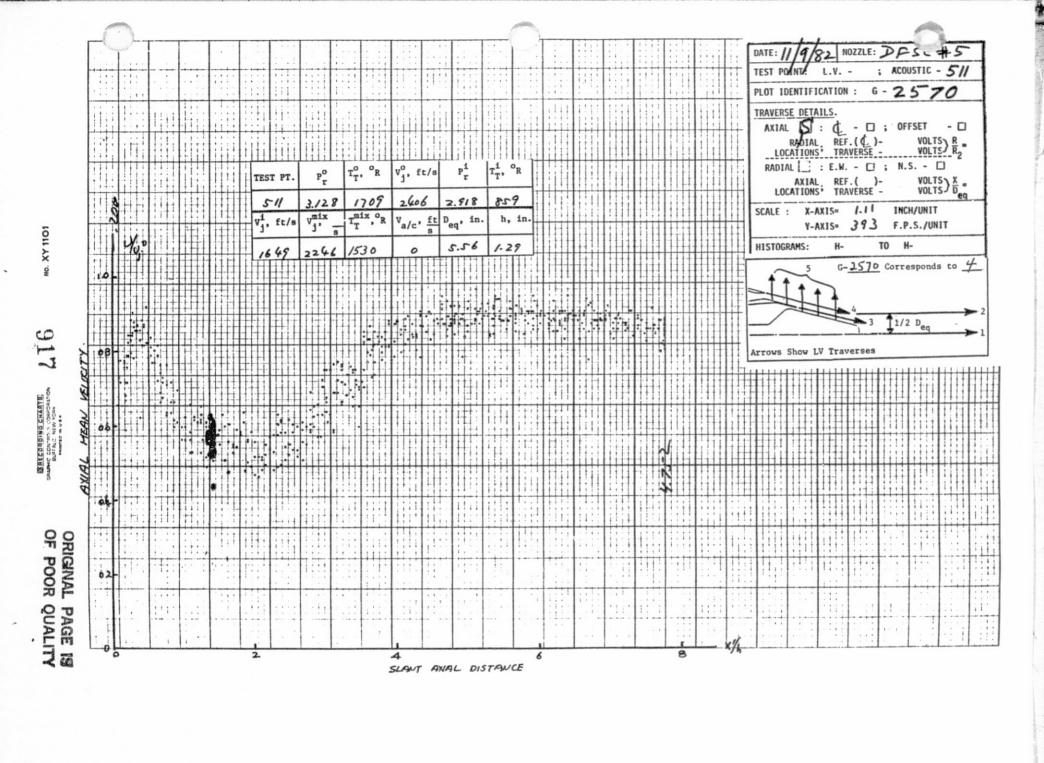
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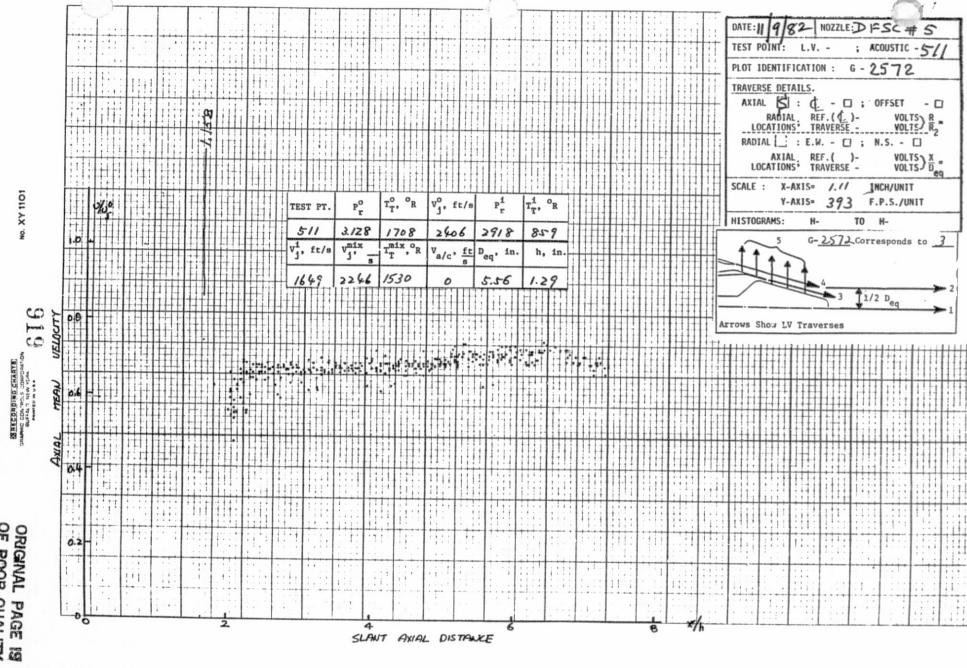


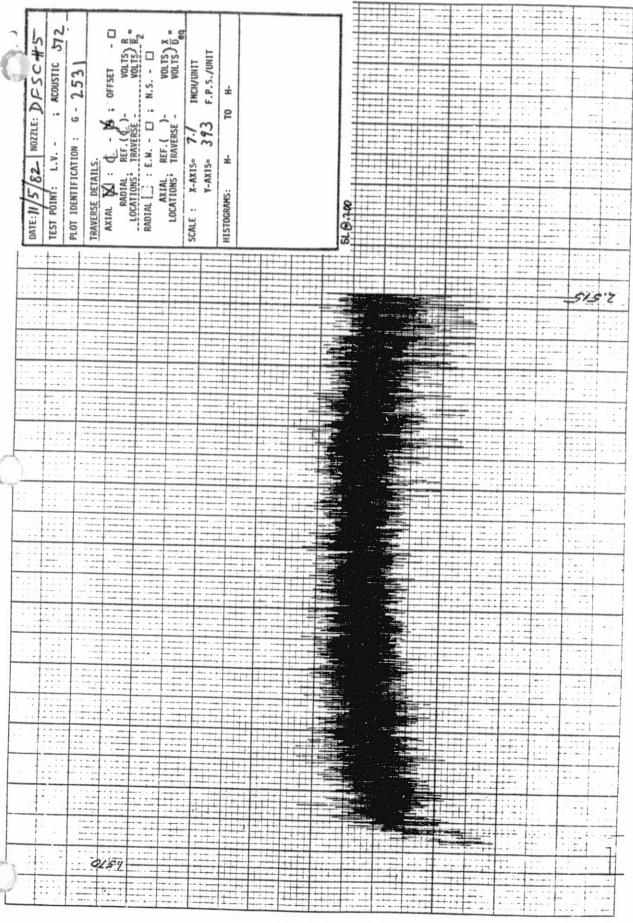
DATE: 11/9/82 NOZZLE: DFSC#5 ; ACOUSTIC - 5/1 TEST POINT: L.V. -PLOT IDENTIFICATION : G - 2571 TRAVERSE DETAILS. AXIAL S: (- ; OFFSET - ; RADIAL REF.() - VOLTS R COCATIONS TRAVERSE - VOLTS R COCATIONS RADIAL [: E.W. - [; N.S. - [] $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= /-// INCH/UNIT Y-AXIS= 393 F.P.S./UNIT TO H-HISTOGRAMS: 5,214

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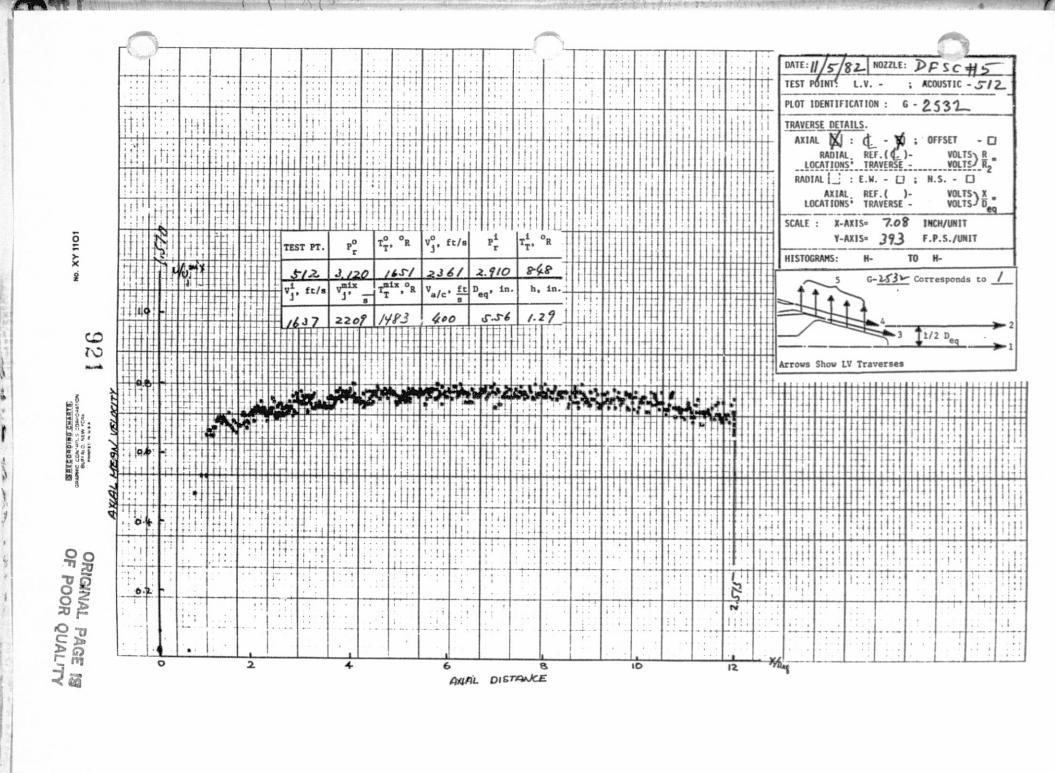
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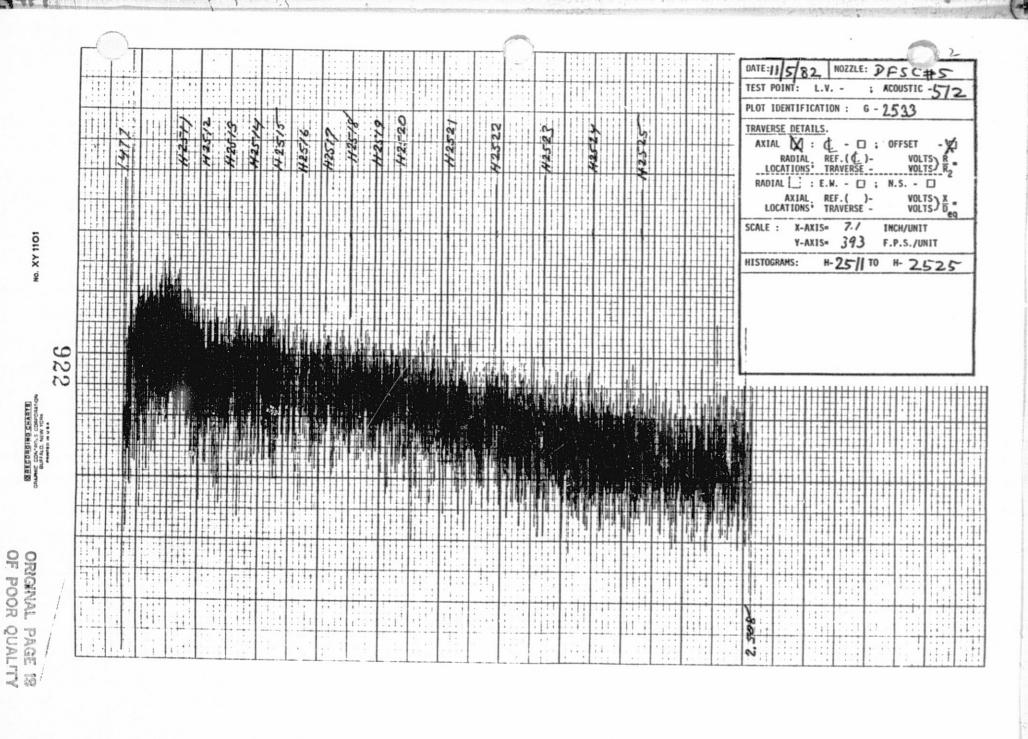
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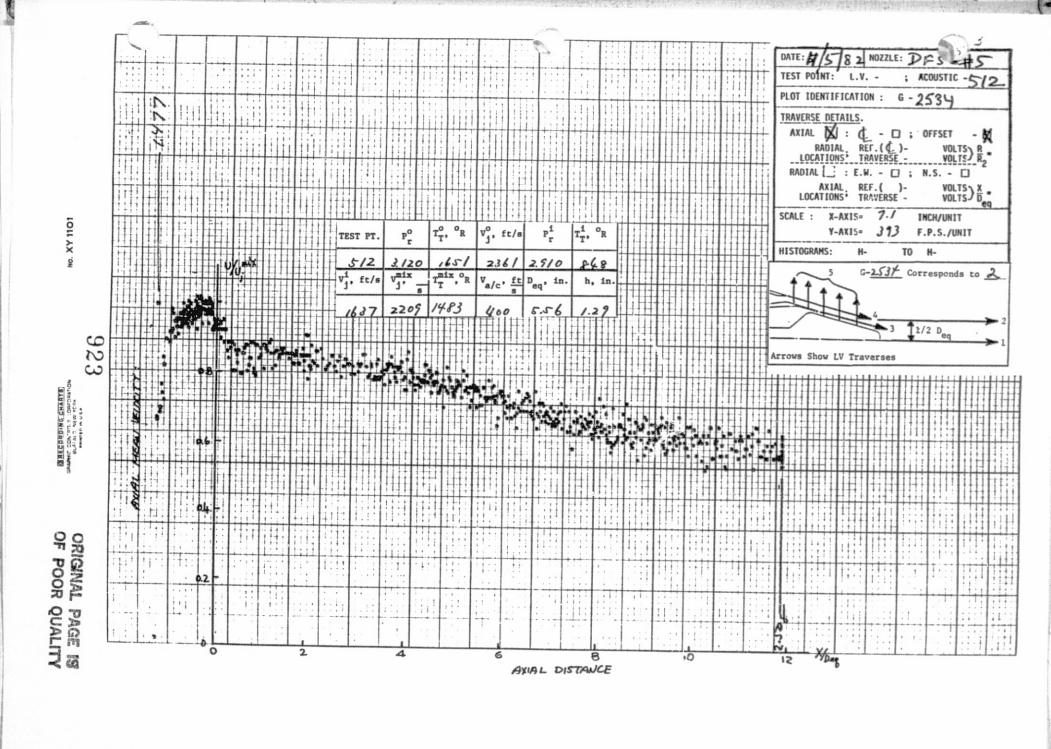


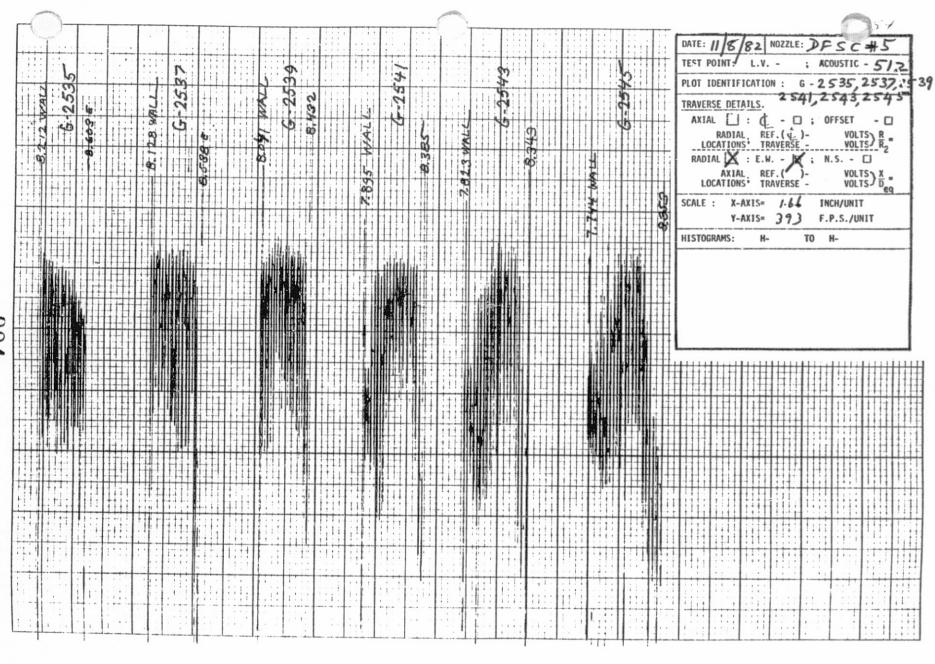


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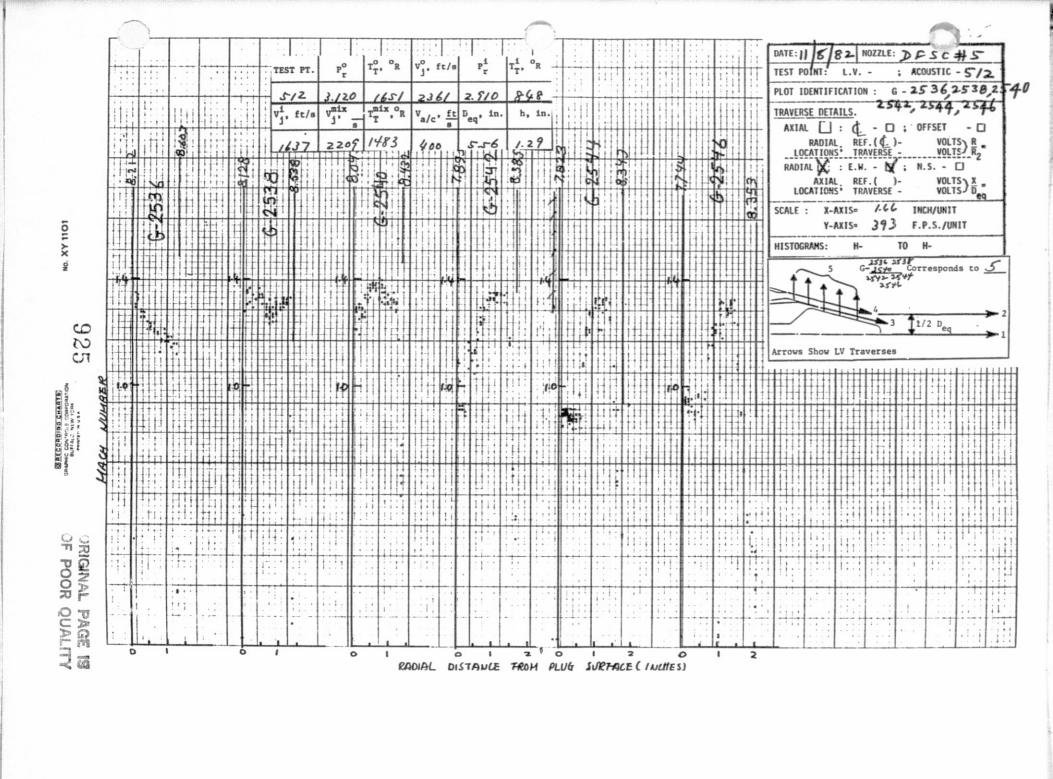






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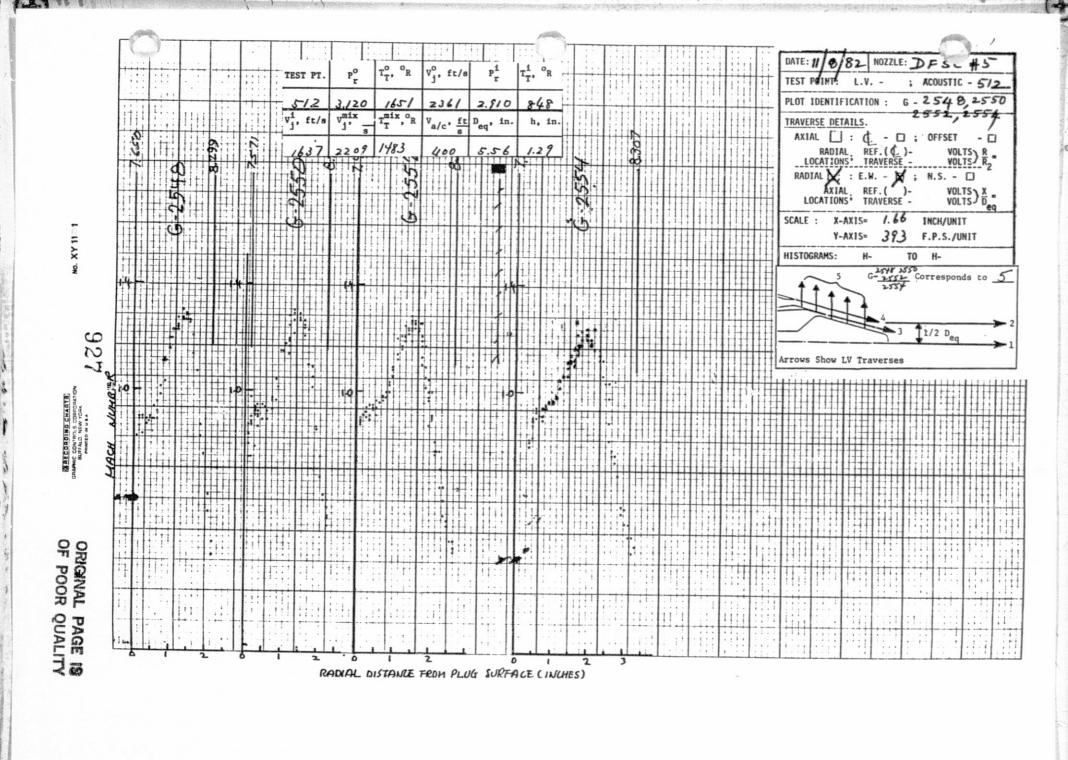


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MINISTER N. V.**

NOZZLE: DPSC TF5 ; ACOUSTIC - 5/2 TEST POINT: L.V. -6-2547,2549 PLOT IDENTIFICATION : 2551, 2553 73710001 TRAVERSE DETAILS. 6-2551 3/6 1996 2553 6 2549 6.299 8301 8.307 S $\frac{\text{VOLTS}}{\text{VOLTS}} \frac{X}{D} =$ 1.66 INCH/UNIT SCALE : X-AXIS= Y-AXIS= 393 F.P.S./UNIT HISTOGRAMS: TO H-111

NO. XY 1101



82 NOZZLE: DESC #5 TEST POENT | L.V. -; ACOUSTIC - 5/2 PLOT IDENTIFICATION : G - 2555 TRAVERSE DETAILS. RAVERSE DETAILS.

AXIAL S: (-); OFFSET - |

RADIAL REF. () - VOLTS R.

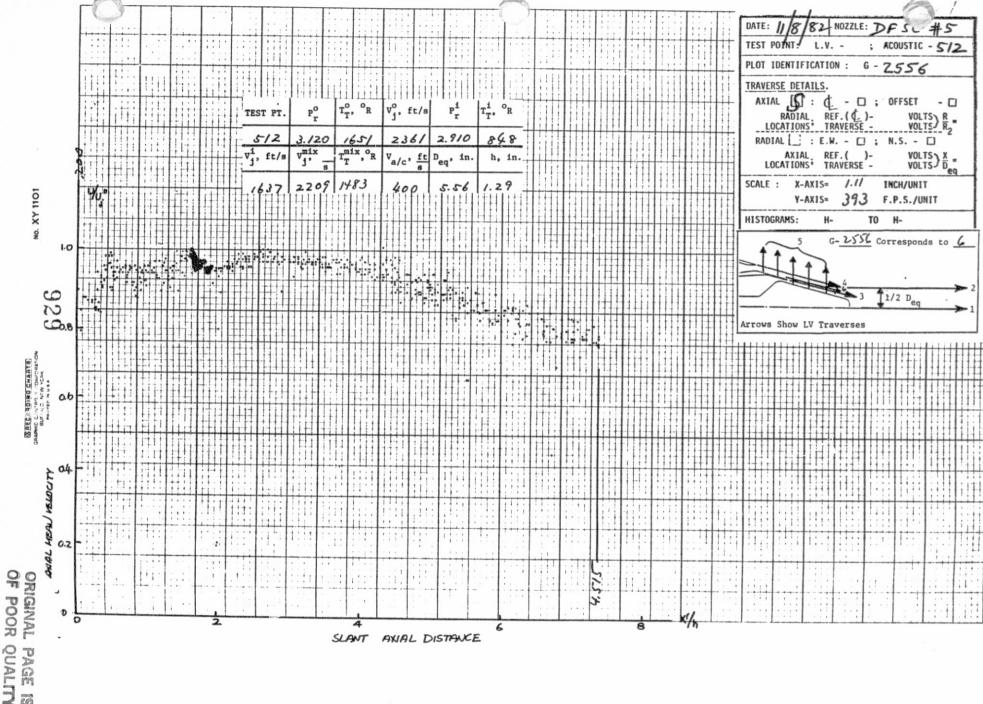
LOCATIONS TRAVERSE - VOLTS R.

RADIAL : E.W. - | ; N.S. - | $\frac{\text{VOLTS}}{\text{VOLTS}}$ $\frac{X}{D} = \frac{1}{eq}$ AXIAL REF. ()-LOCATIONS TRAVERSE -SCALE : X-AXIS= /-// INCH/URIT Y-AXIS= 393 F.P.S./UNIT TO H-HISTOGRAMS: 4.545 111:

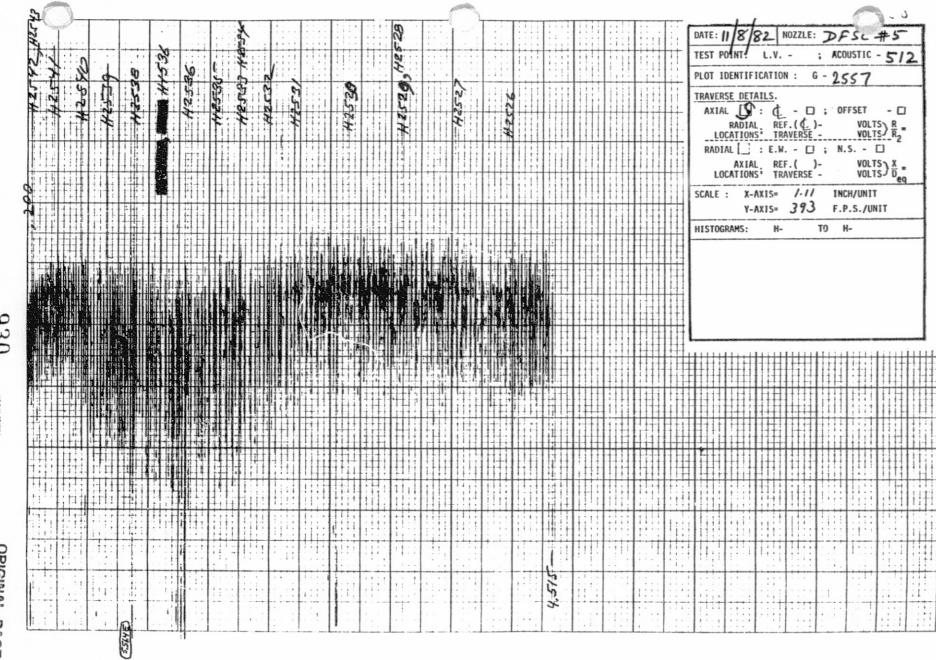
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BUFFALC NEW YORK
PRINTED IN U.S.A.

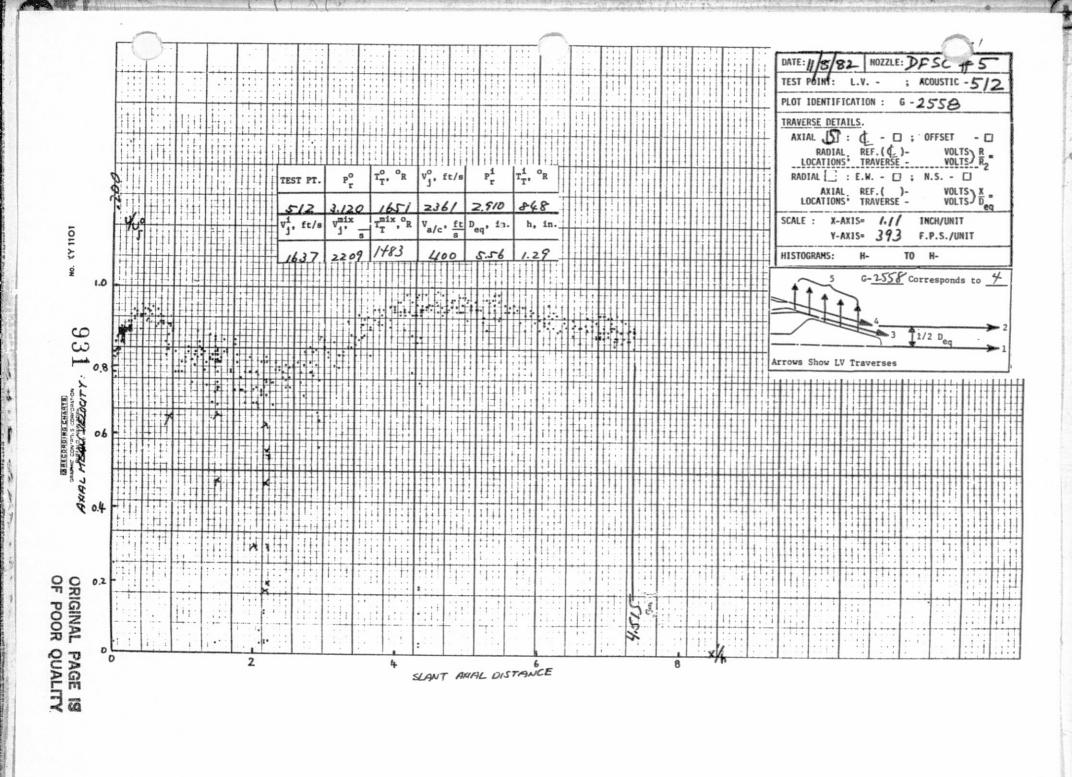


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BUFALC, NEW YGR.
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TEST POINT: L.V. -NOZZLE: DF S ; ACOUSTIC -/5// PLOT IDENTIFICATION : G - 1215 TRAVERSE DETAILS. AXIAL X : Q - X ; OFFSET - C

RADIAL REF. (Q) - VOLTS R

LOCATIONS TRAVERSE - VOLTS R

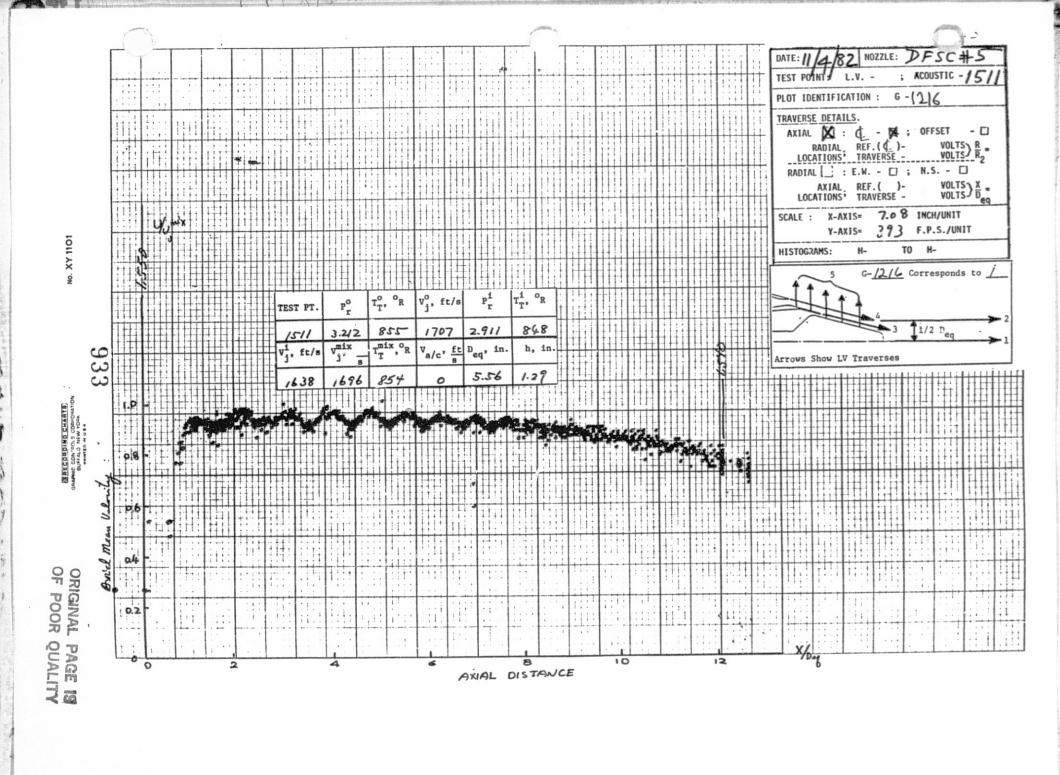
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No. XY 1101

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TEST POINT: L.V. -; ACOUSTIC -15/1 PLOT IDENTIFICATION : G-1217 TRAVERSE DETAILS. AXIAL X : (- 1 ; OFFSET

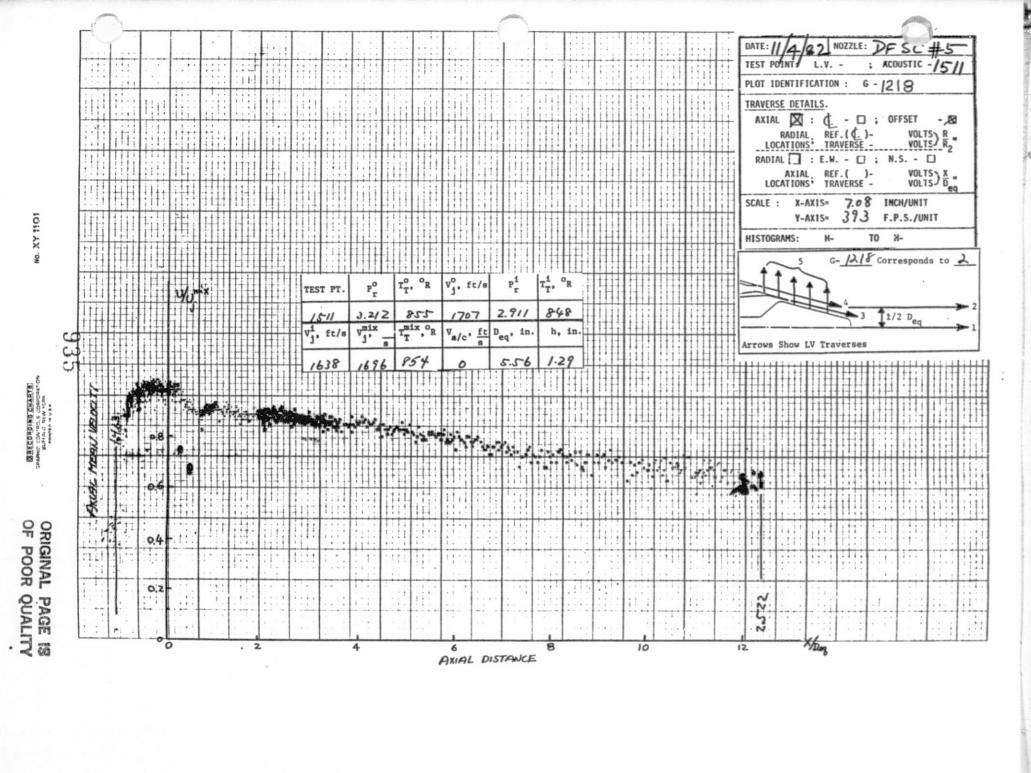
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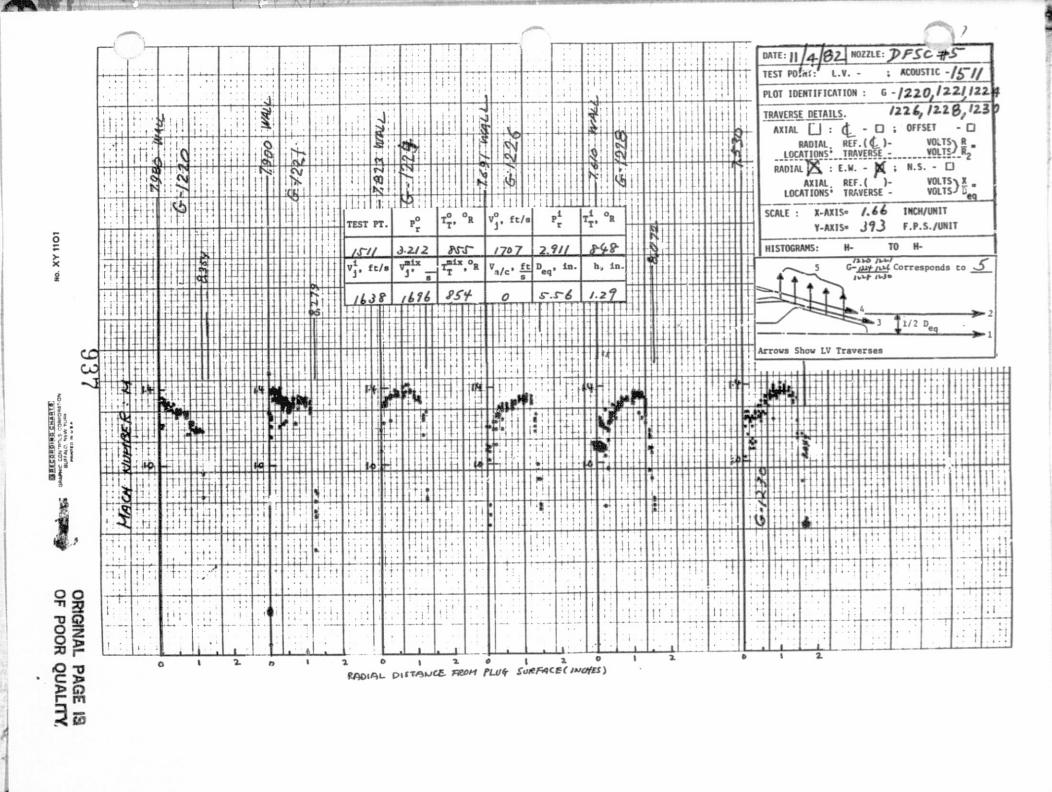
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TEST POINT ; ACOUSTIC -1511 L.V. -6-1231,1233 1235,1237 PLOT IDENTIFICATION : 7.320 WALL TRAVERSE DETAILS. AXIAL : C - : OFFSET
RADIAL REF.(C) - VOLTS

LOCATIONS TRAVERSE - VOLTS

RADIAL : E.W. - X ; N.S. - :

AXIAL REF.() - VOLTS

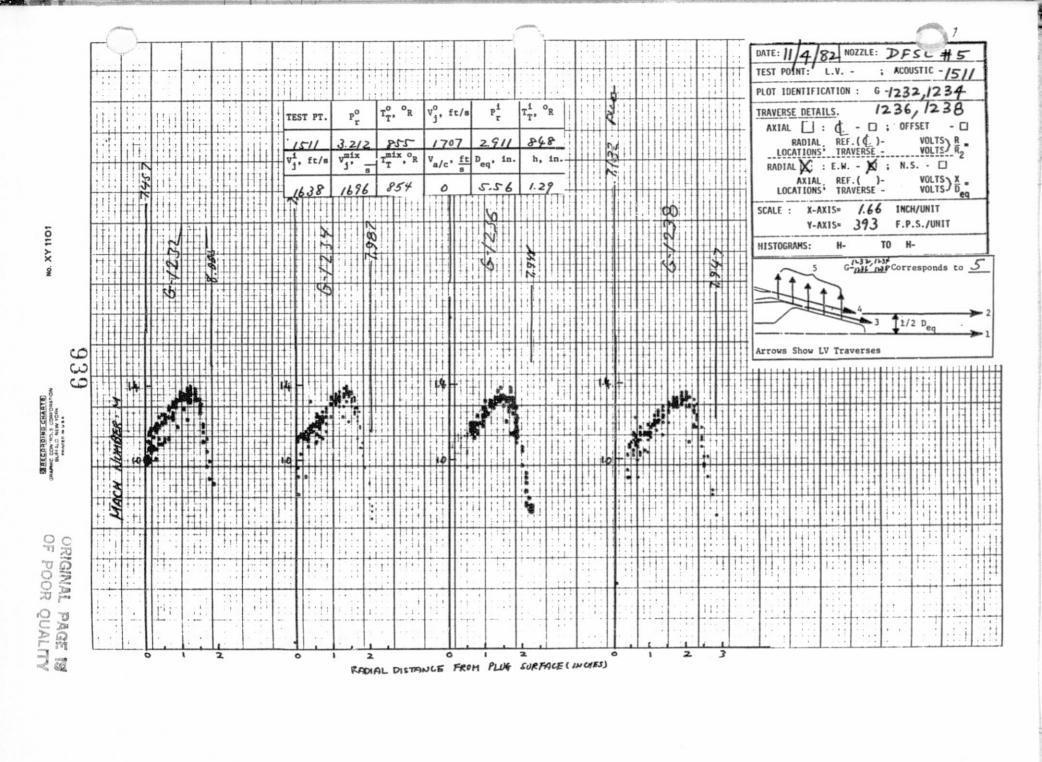
LOCATIONS TRAVERSE - VOLTS 6-1233 132 123 < 187 VOLTS) X = SCALE : X-AXIS= 1.66 INCH/UNIT 393 F.P.S./UNIT HISTOGRAMS: TO H-9 ω ∞ ++++

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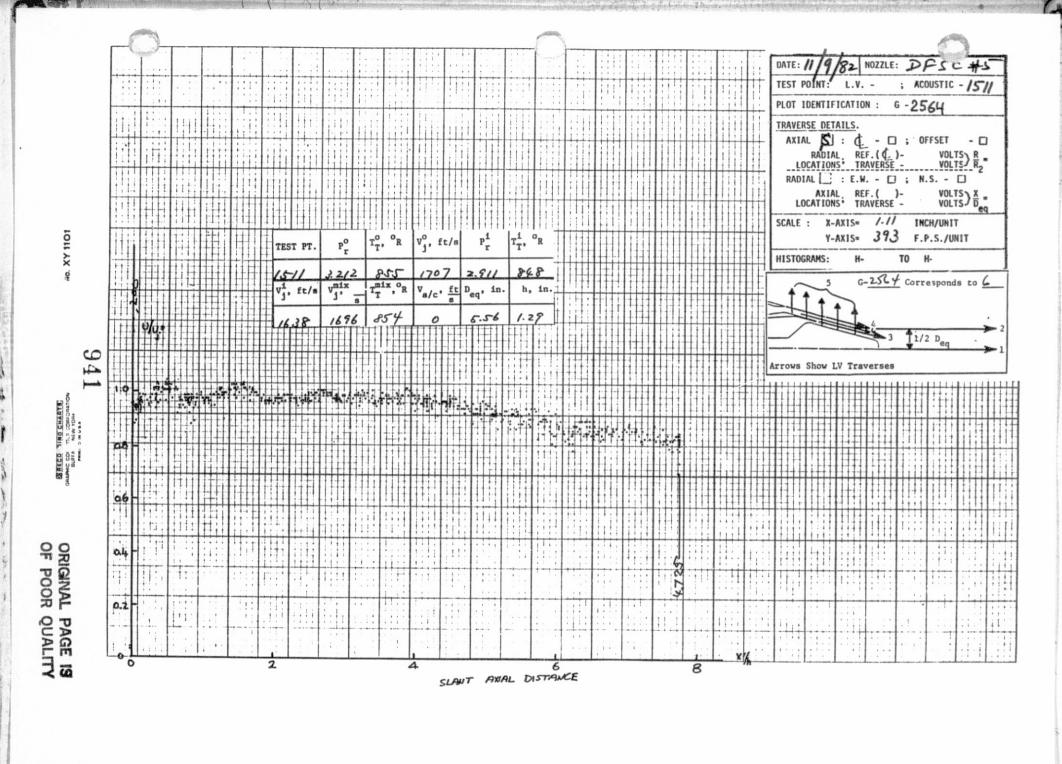


DATE: 11/9/82 NOZZLE: DF = C #5 TEST POINT: L.V. -; ACOUSTIC - 15// PLOT IDENTIFICATION : G-2563 TRAVERSE DETAILS. AXIAL S: Q - D; OFFSET - D

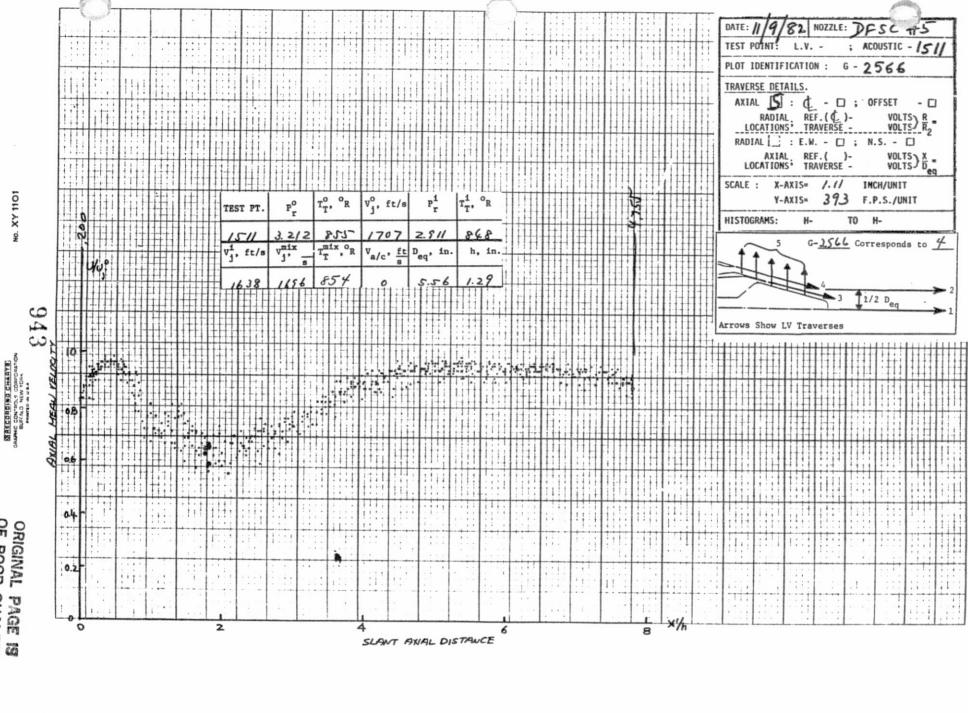
RADIAL REF. (Q) - VOLTS) R

LOCATIONS TRAVERSE - VOLTS RADIAL : E.W. - [] ; N.S. - [] VOLTS) X = AXIAL REF.()-LOCATIONS TRAVERSE -/.// INCH/UNIT SCALE : X-AXIS= Y-AXIS= 393 F.P.S./UNIT TO H-HISTOGRAMS: ORIGINAL PAGE IS OF POOR QUALITY

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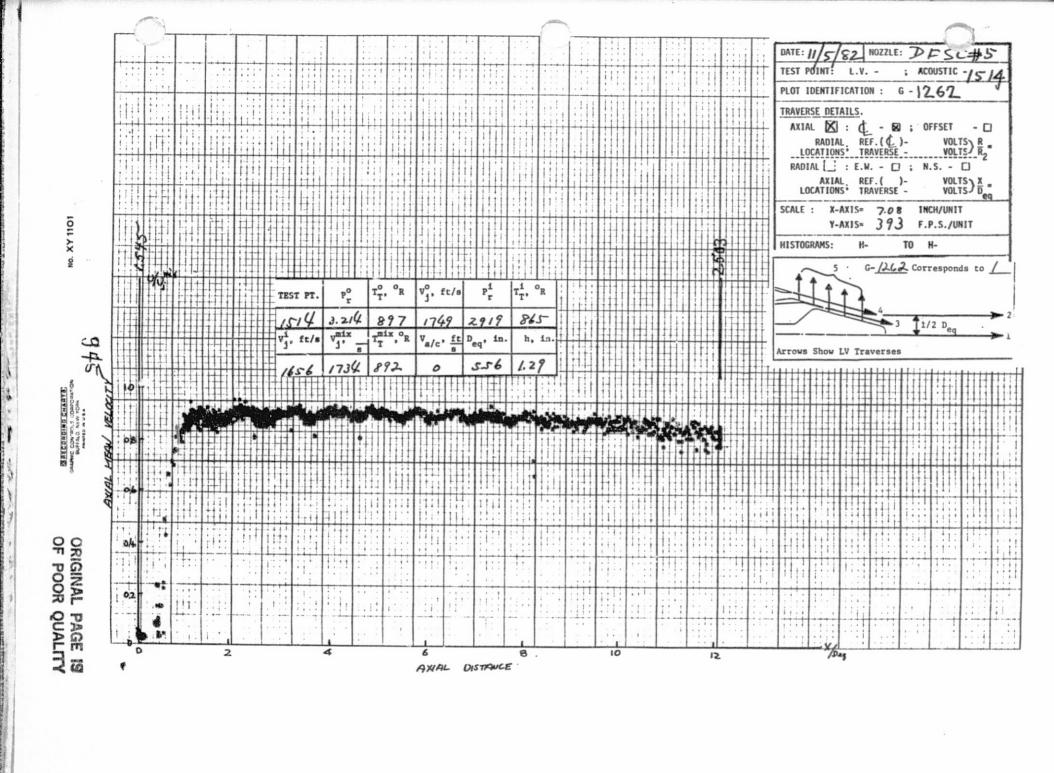


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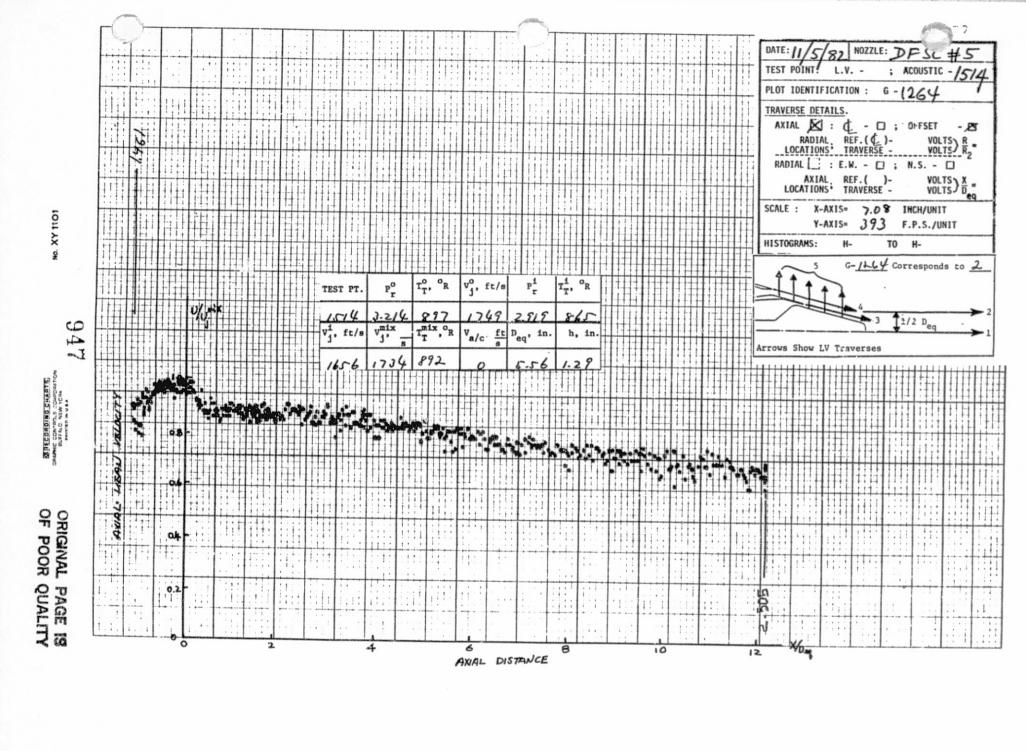


DATE: 11/5/82 NOZZLE: DFSC #5 : ACOUSTIC - 1514 TEST POINT: L.V. -PLOT IDENTIFICATION : 6-1263 TRAVERSE DETAILS. 1308 AXIAL M: C - D; OFFSET - 183

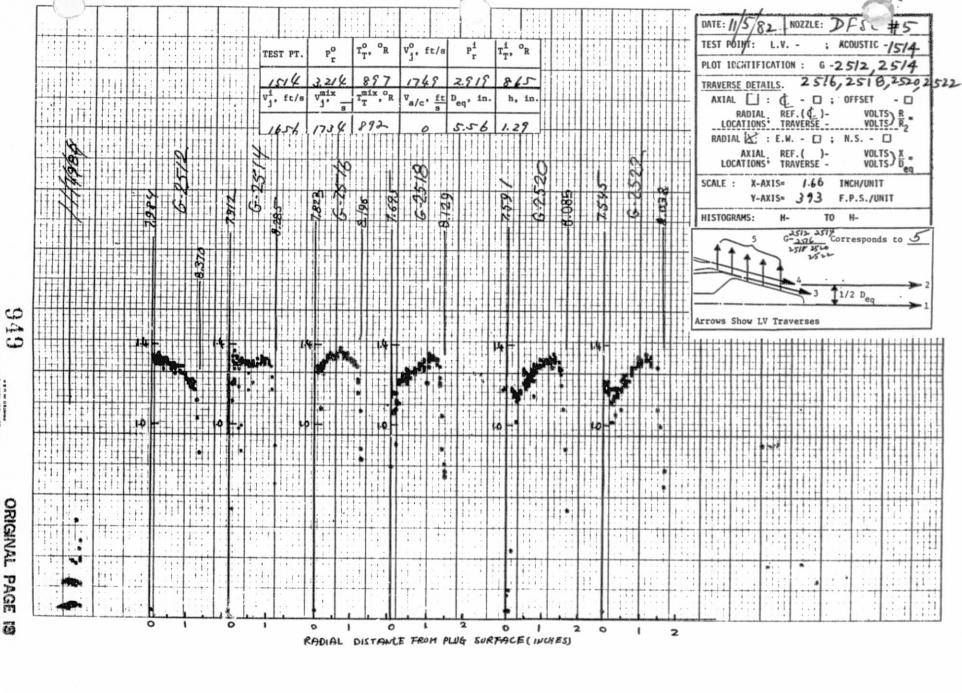
RADIAL REF. (C) - VOLTS) R
LOCATIONS' TRAVERSE - VOLTS R
2 2523 2507 H2498 42.506 18497 42302 fest 3645 RADIAL [: E.W. - [] ; N.S. - [] $\frac{\text{VOLTS}}{\text{VOLTS}}$ SCALE : X-AXIS= 7./ INCH/UNIT Y-AXIS= 393 F.P.S./UNIT H- 2510 HISTOGRAMS: 946

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NOZZLE: DFSC # TEST POINT: L.V. -; ACOUSTIC - 1514 PLOT IDENTIFICATION: 6-2511,25/3 | TRAVERSE DETAILS. | 25/5, 25/7, 25/9-52/ |
AXIAL		: (1 -	: OFFSET -		'
RADIAL	REF. (1 -	VOLTS	R		
LOCATIONS' TRAVERSE - VOLTS	R				
AXIAL	REF. (1 -	VOLTS	X		
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LOCATIONS' TRAVERSE - VOLTS	X				
LOCATIONS' TRAVERS TRAVERSE DETAILS. 6-2517 7.823 WALL 6-25 6-25/3 6.251 8,129 8.085 SCALE : X-AXIS= 1.66 INCH/UNIT 9.038 Y-AXIS- 393 F.P.S./UNIT HISTOGRAMS: TO H-1::					



DATE: 11/5/82 NOZZLE: DPSC #5 TEST POINT: L.V. -; ACOUSTIC -1514 PLOT IDENTIFICATION : TRAVERSE DETAILS. 2527, 2528

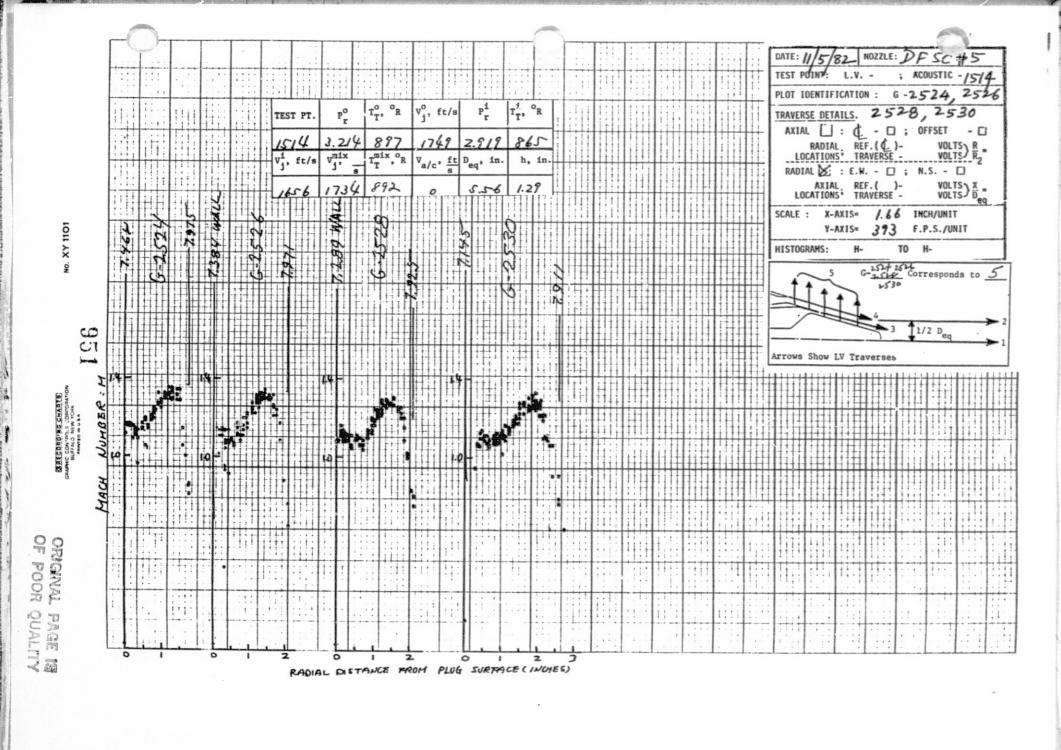
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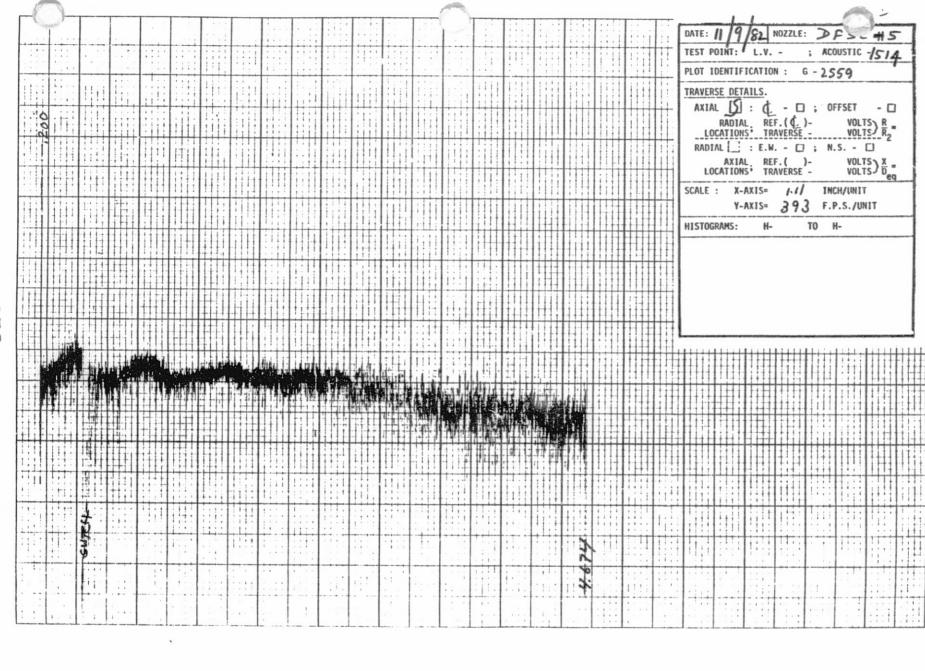
RADIAL REF. (d) - VOLTS R VOLTS R

LOCATIONS' TRAVERSE - VOLTS R

AXIAL REF. () - VOLTS X

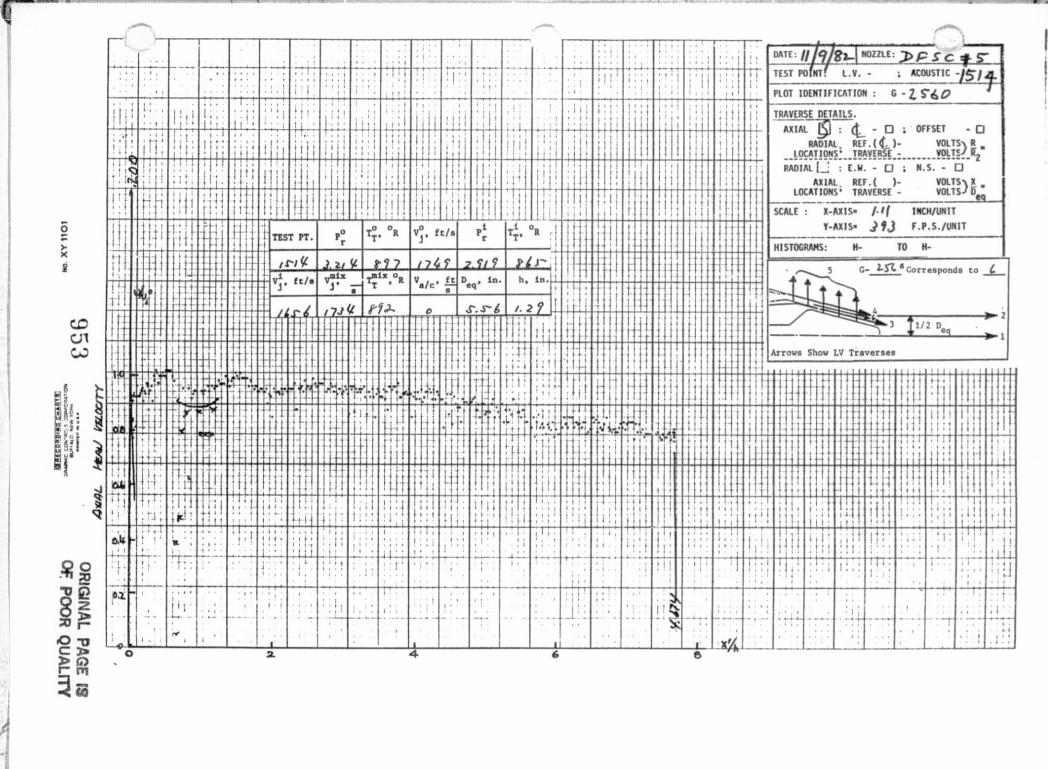
LOCATIONS' TRAVERSE - VOLTS X TRAVERSE DETAILS. 6.2528 $\frac{\text{VOLTS}}{\text{VOLTS}}$ $\frac{X}{D_{eq}}$ LOCATIONS TRAVERSE -SCALE : X-AXIS= 1.66 INCH/UNIT Y-AXIS= 373 F.P.S./UNIT HISTOGRAMS: TO H-111 11 111 ---





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DATE: 11/9/82 NOZZLE: DFSL#5 TEST POINT: L.V. -; ACOUSTIC -1514 PLOT IDENTIFICATION : G - 2561 TRAVERSE DETAILS. AXIAL S: d - G; OFFSET

RADIAL REF.(d)- VOL

LOCATIONS' TRAVERSE - VOL - 0 HZSY8 NECYF RADIAL [: E.W. - [; N.S. - [$\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL, REF.()-2583 #25.T. LOCATIONS TRAVERSE -HZSC SCALE : X-AXIS= /.// INCH/UNIT Y-AXIS= 393 F.P.S./UNIT H-2544TO H-2564 HISTOGRAMS: 95 : 1 111:

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5.2.3.6 Mean Velocity Traces of DFSC-6

DATE: 11/12/82 NOZZLE: DESC #6 TEST POINT: L.V. -; ACOUSTIC -619 PLOT IDENTIFICATION : G - 3016 TRAVERSE DETAILS. AXIAL AXIAL REF. () - WI ; OFFSET - CI RADIAL REF. () - VOLTS R. R. RADIAL CATIONS, TRAVERSE - VOLTS R. RADIAL C : E.W. - C ; N.S. - C $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= 7-/ INCH/UNIT Y-AXIS= 388 F.P.S./UNIT HISTOGRAMS: H-TO H-1

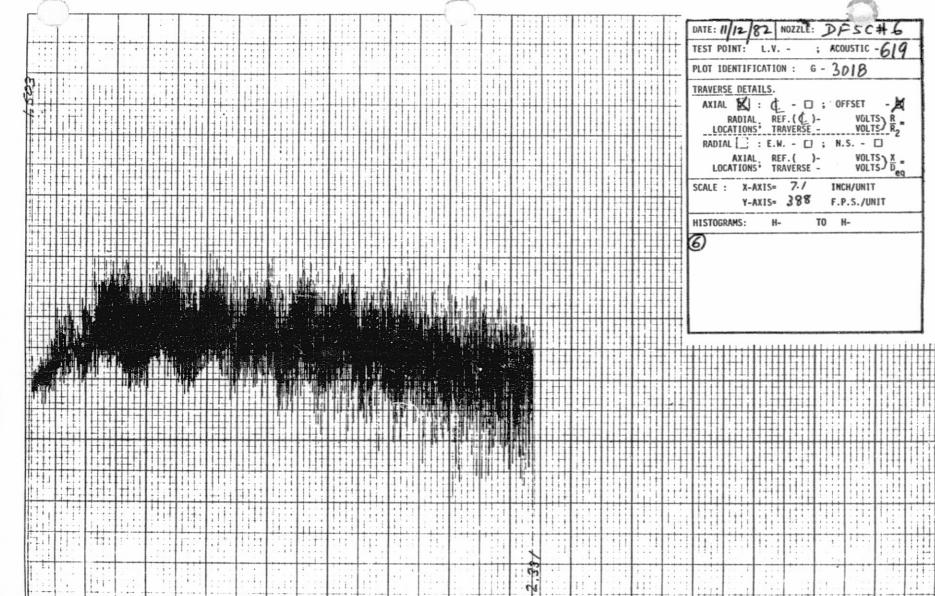
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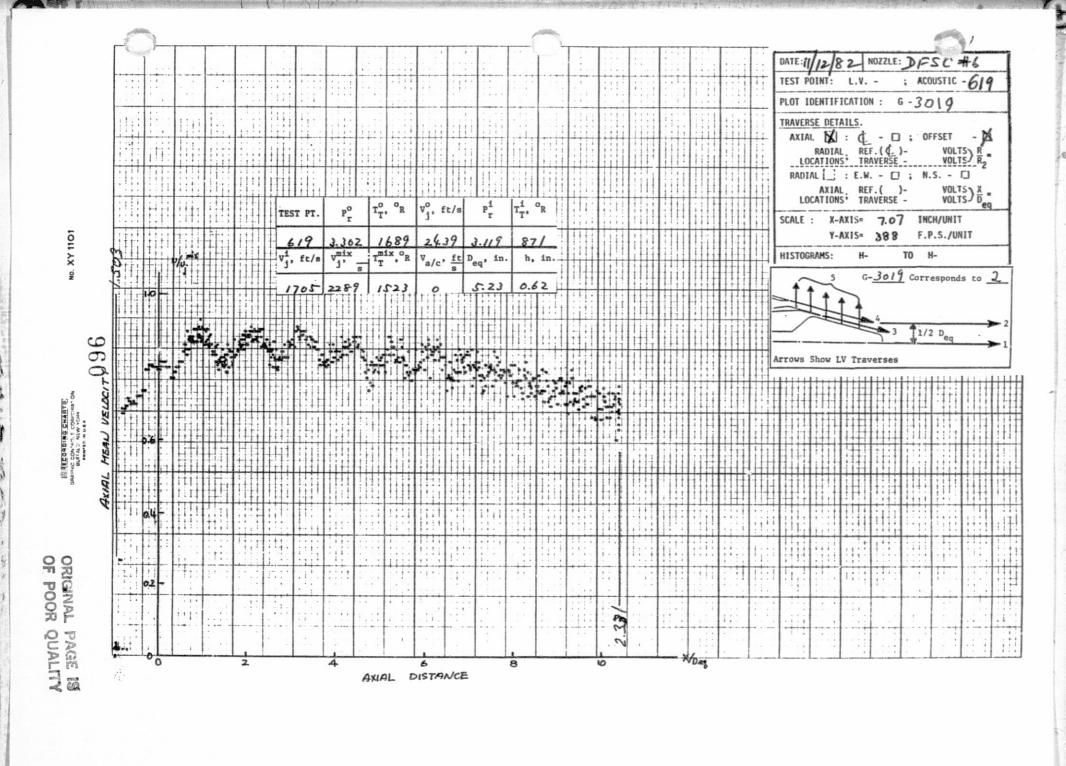
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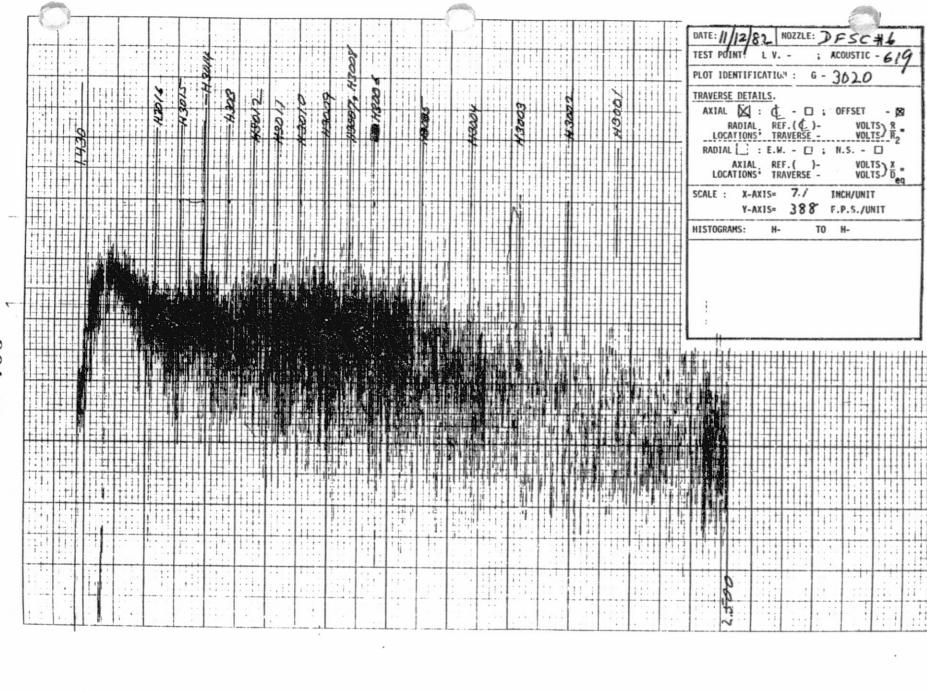
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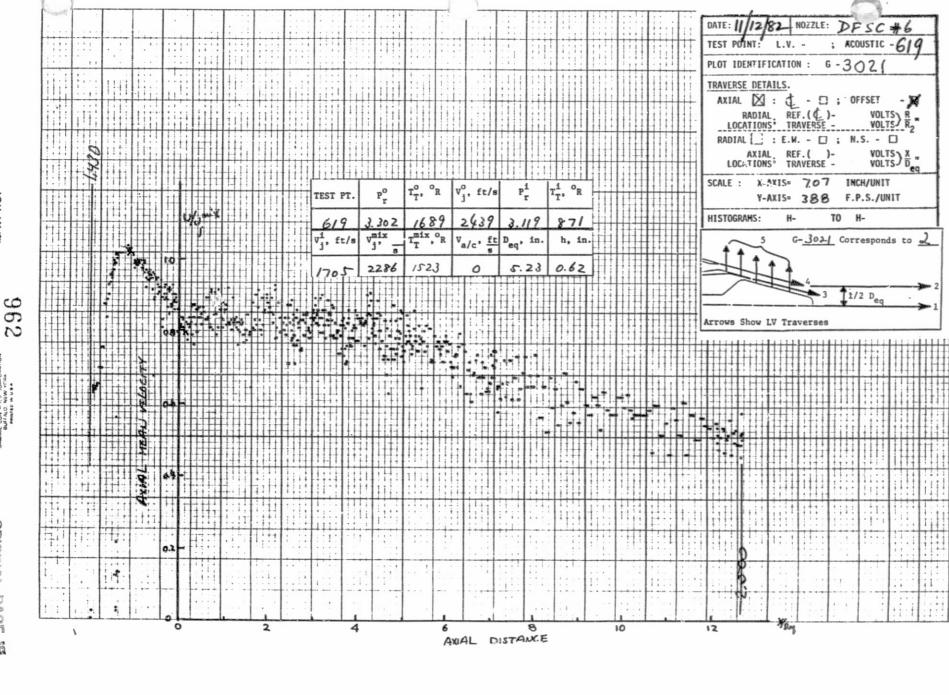
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82 NOZZLE: DFSC#6 ; ACOUSTIC -620 TEST POINT: L.V. -PLOT IDENTIFICATION : G - 3010 TRAVERSE DETAILS. AXIAL : (-); OFFSET

RADIAL REF.(()- VOLTS)

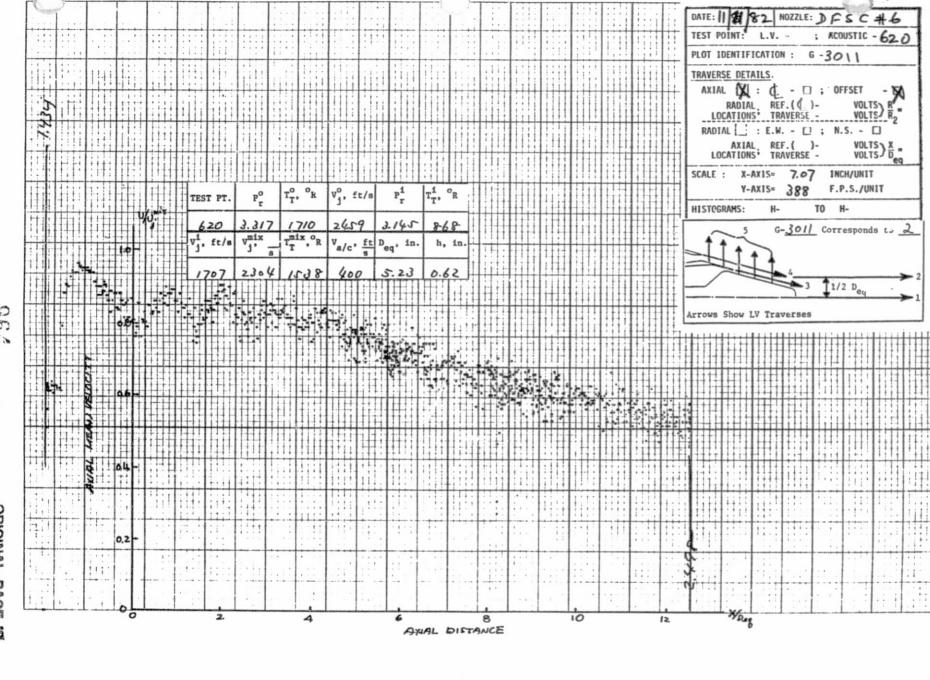
LOCATIONS TRAVERSE - VOLTS

RADIAL : E.W. - ; N.S. - [] $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= 7-/ INCH/UNIT Y-AXIS= 388 F.P.S./UNIT HISTOGRAMS: TO H-(5) 111

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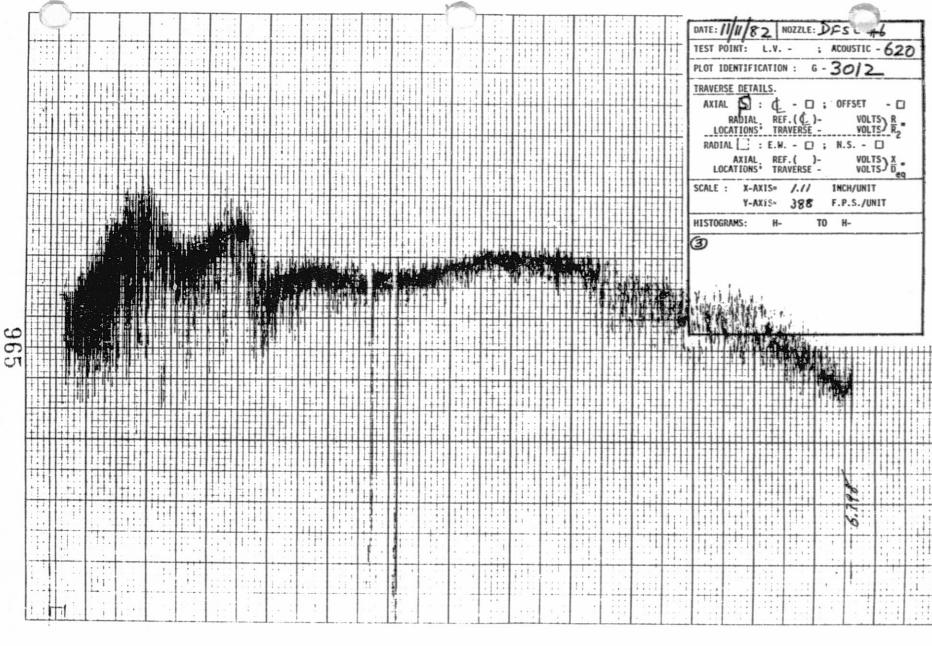
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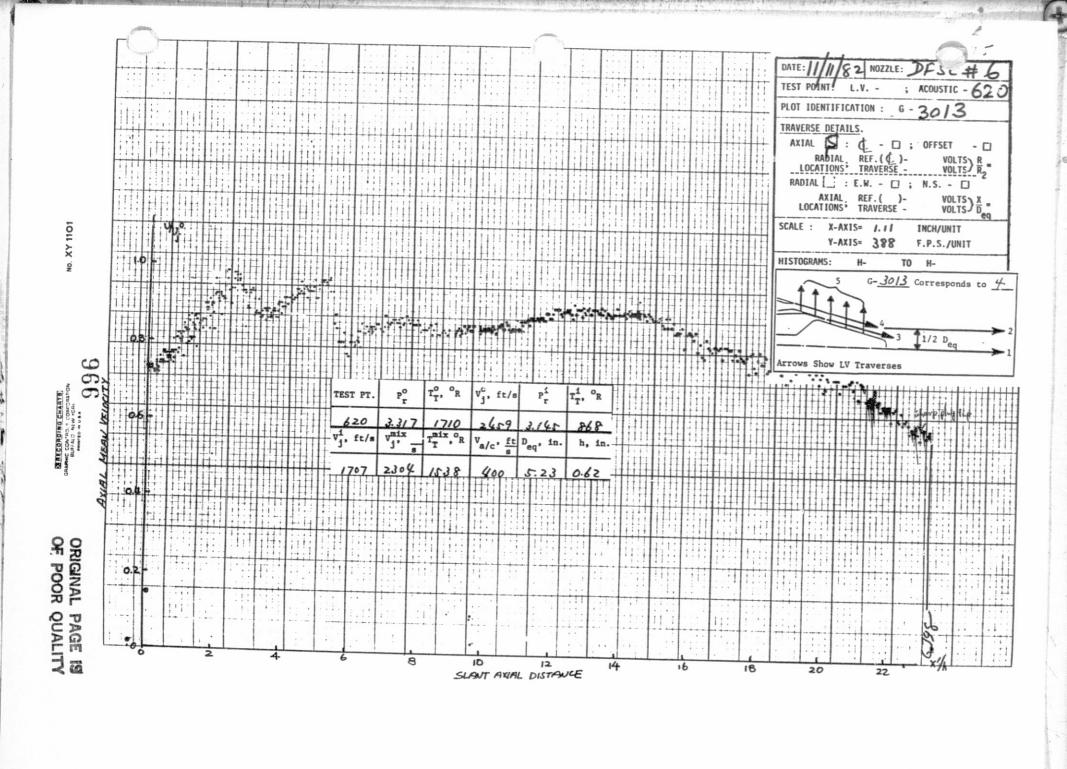
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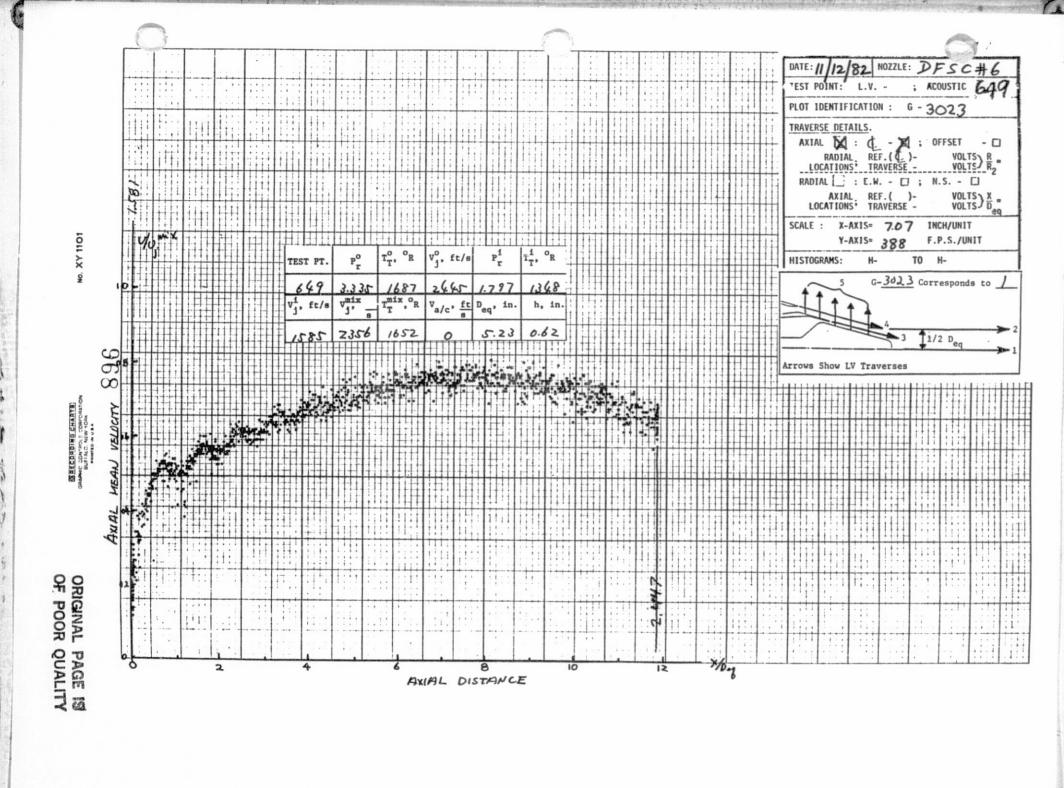
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TEST POINT: L.V. - ; ACOUSTIC PLOT IDENTIFICATION : G - 3027 TRAVERSE DETAILS. AXIAL X : (- D); OFFSET - C RADIAL REF. (-) VOLTS R LOCATIONS, TRAVERSE - VOLTS R RADIAL : E.M. - C; N.S. - C $\frac{\text{VOLTS}}{\text{VOLTS}}$ AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= 7./ INCH/UNIT Y-AXIS= 388 F.P.S./UNIT TO H-HISTOGRAMS: 96 2.44

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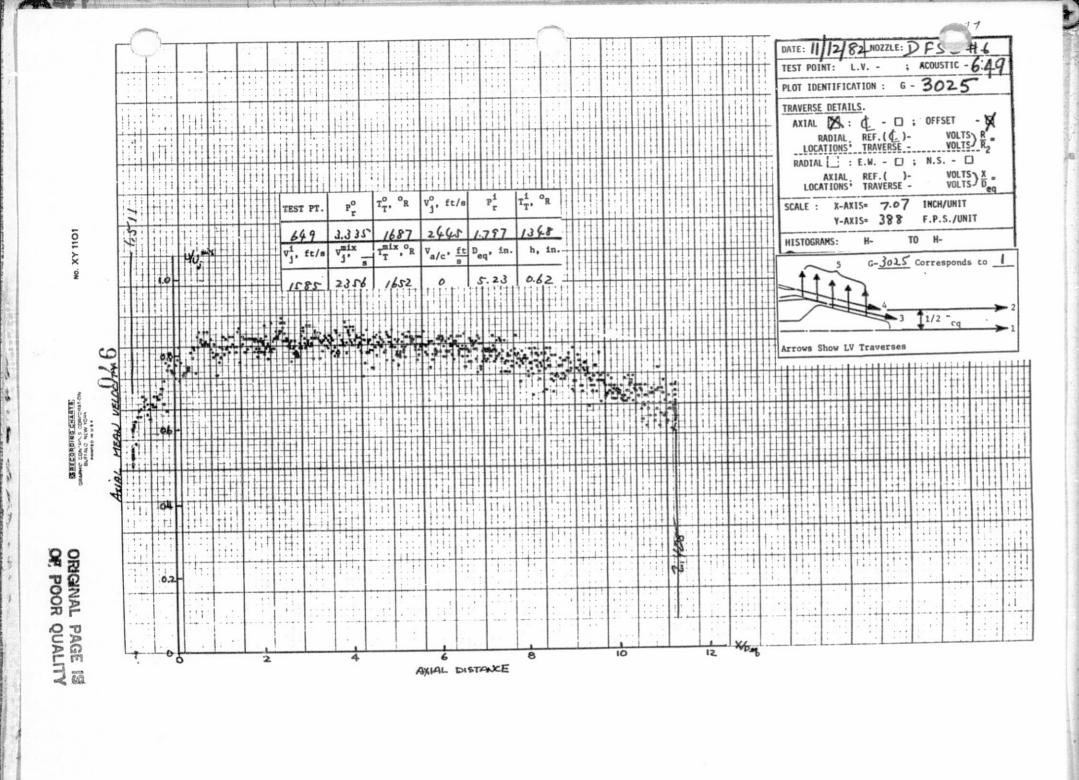
DATE: 11 12 82 NOZZLE: DF 3 4 6 TEST POINT: L.V. -: ACOUSTIC 649 PLOT IDENTIFICATION : 6-3024 TRAVERSE DETAILS. AXIAL X : (- [] ; OFFSET RADIAL REF. (() - VOLTS) R - LOCATIONS' TRAVERSE - VOLTS R - RADIAL : E.W. - : N.S. - : VOLTS) X = AXIAL REF.()-LOCATIONS TRAVERSE -SCALE : X-AXIS= 7./ INCH/UNIT Y-AXIS= 388 F.P.S./UNIT HISTOGRAMS: H-TO H-H 2,408 !! iii:

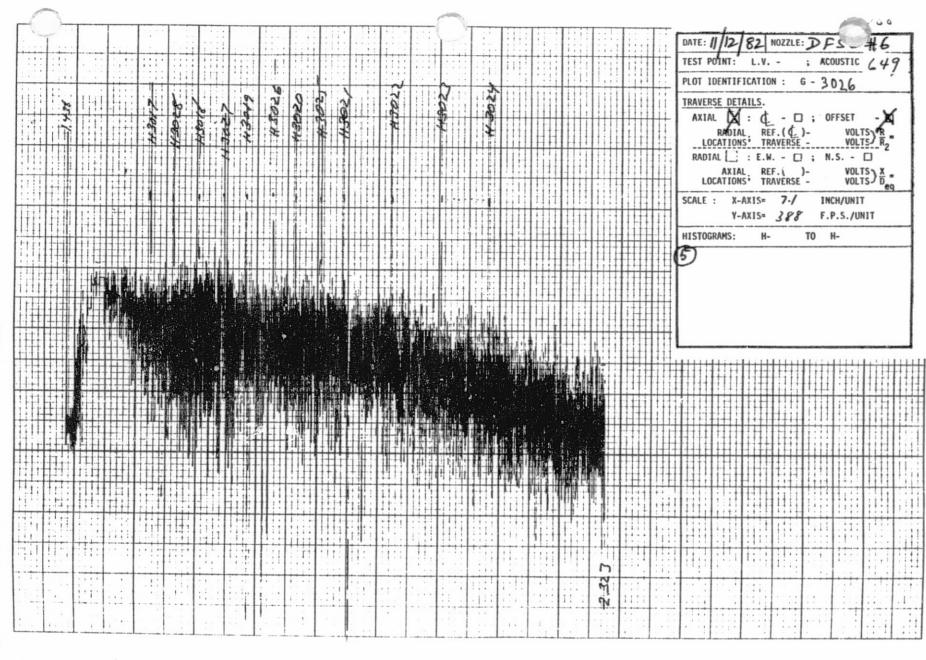
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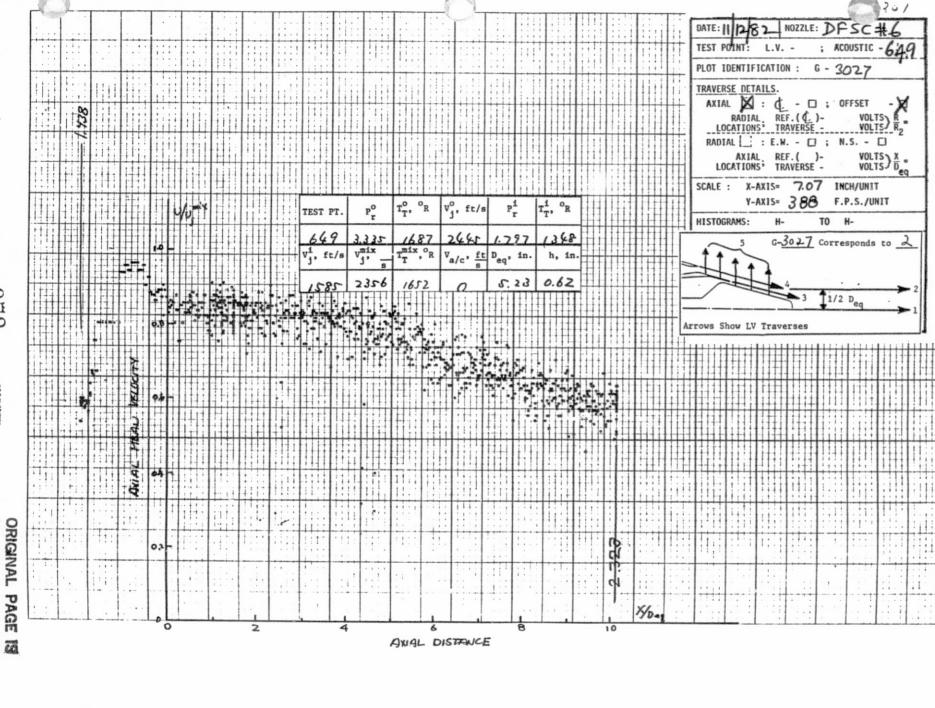
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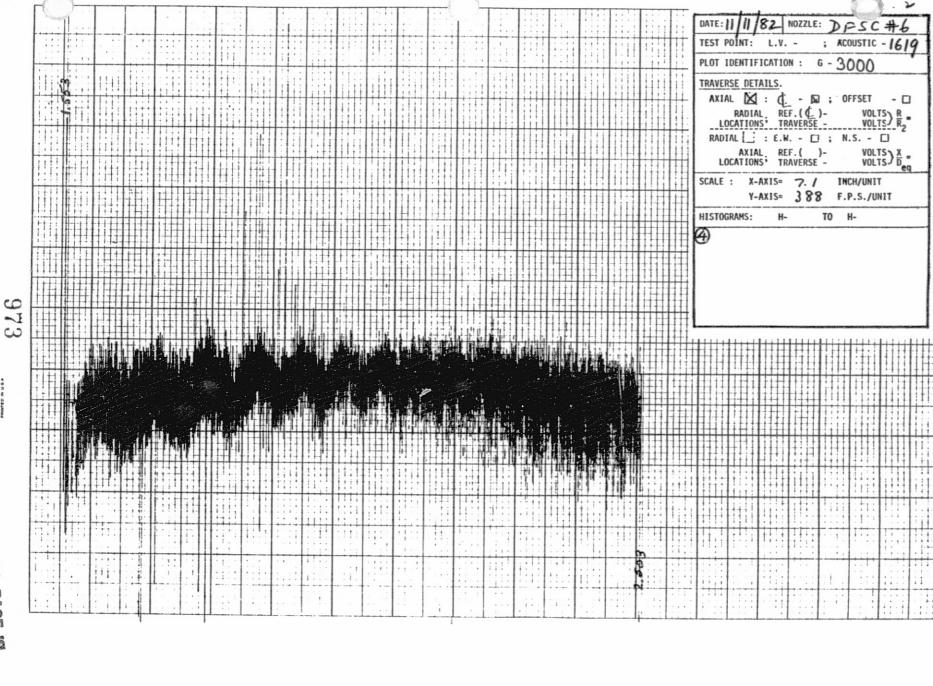
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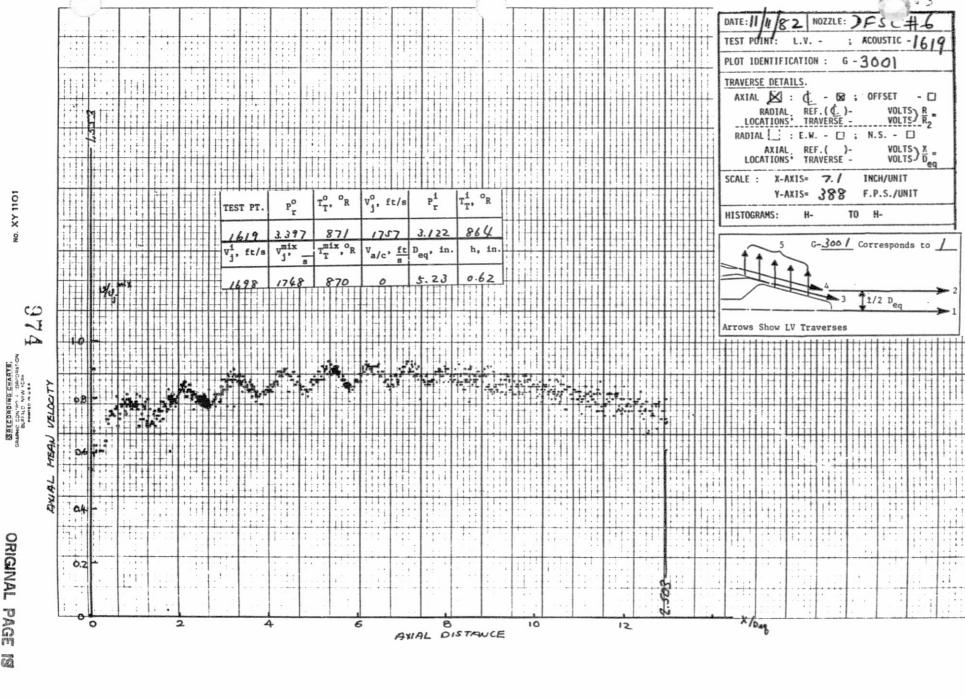
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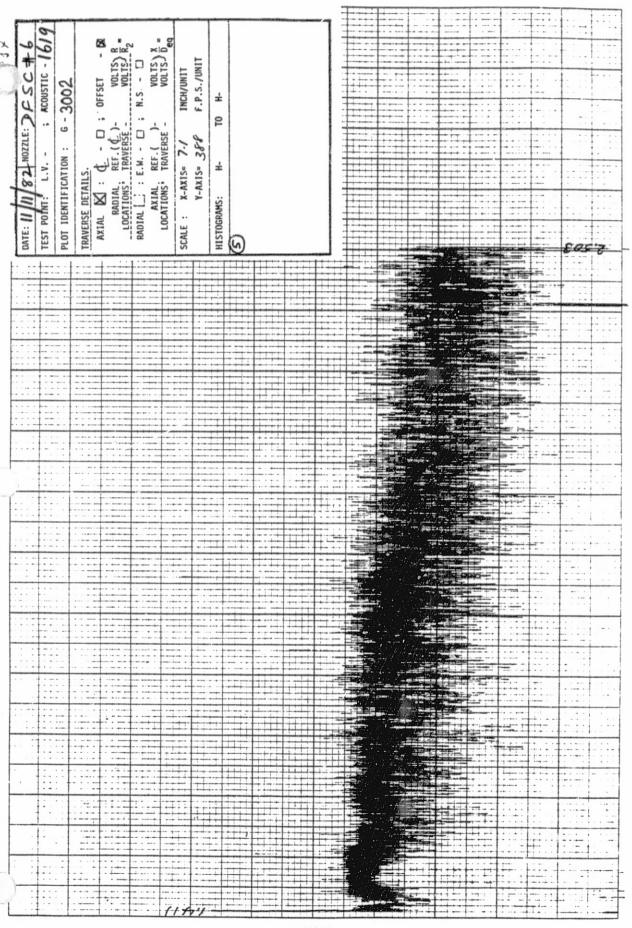
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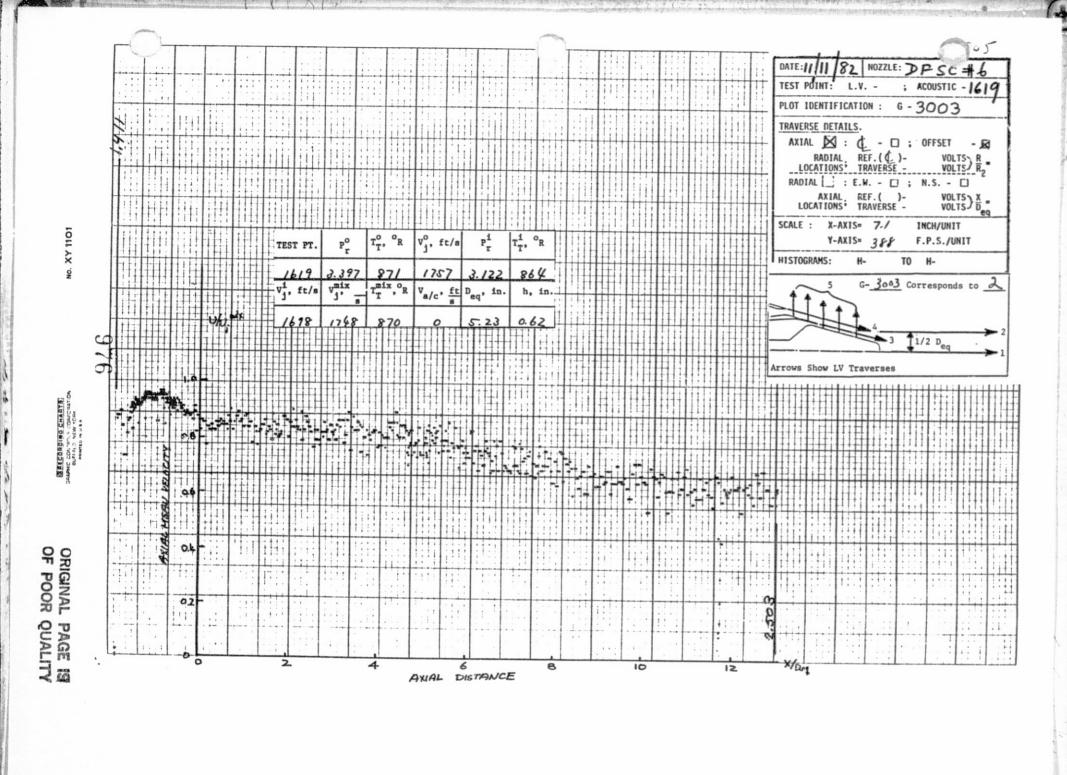
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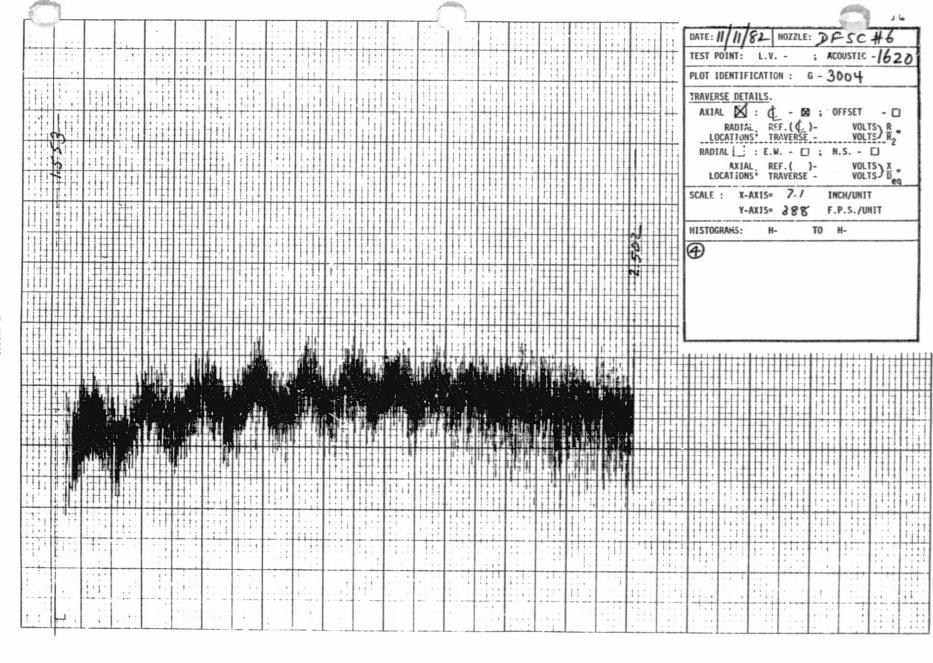
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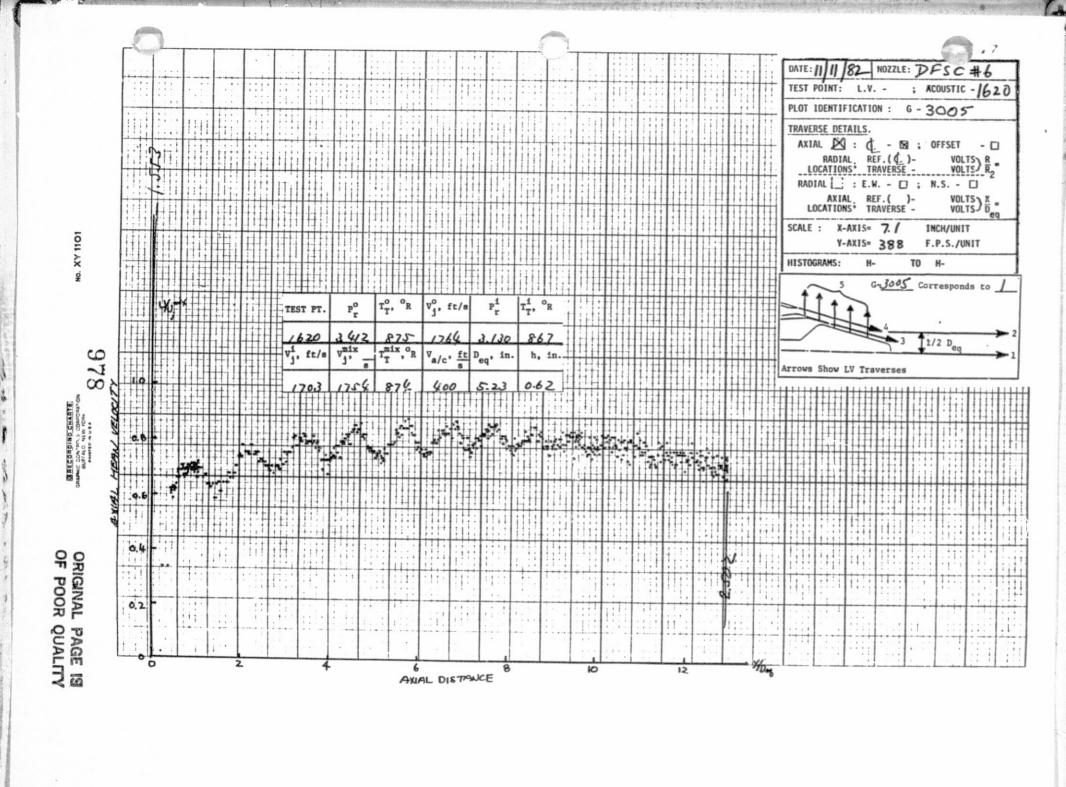


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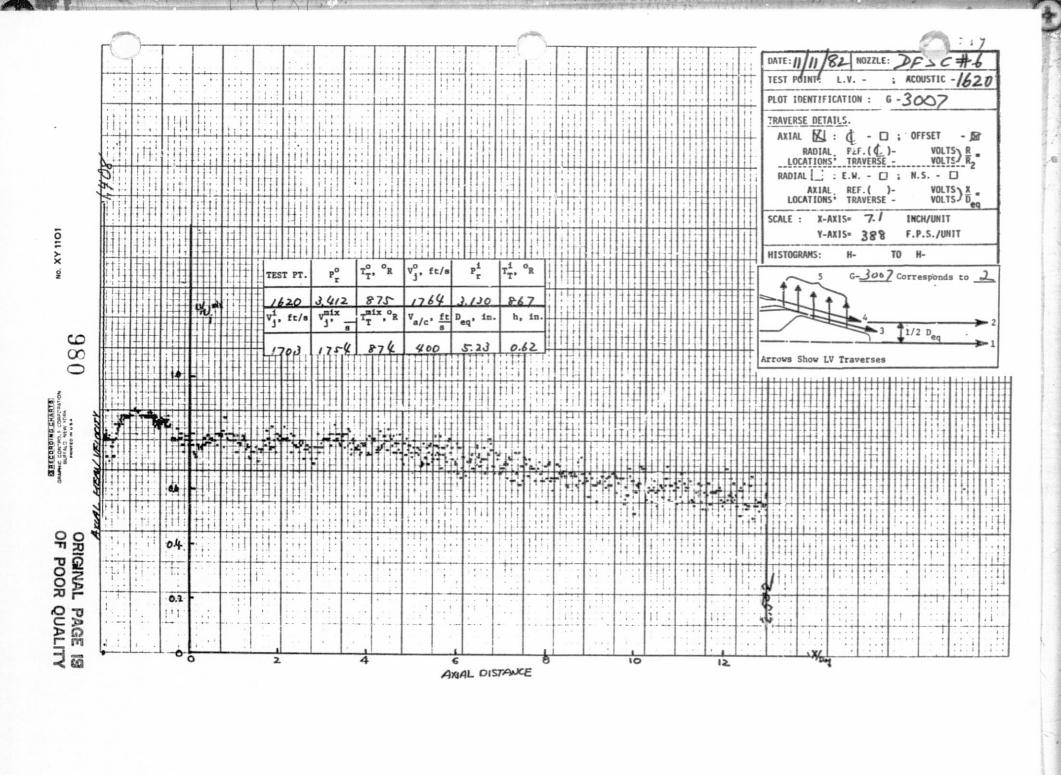
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6.0 STATIC PRESSURE TEST DATA

In addition to the acoustic,LV and shadowgraph tests, static pressure measurements were performed with the coannular C-D plug nozzle (DFSC-2) and the coannular C-D suppressor nozzle (DFSC-5). The objective of these tests was to define the actual C-D operating condition. During the work effort for the companion contract NAS3-22514*, a limited number of static pressure measurements were performed in the base pressure regions of the chutes of the 20-shallow-chute suppressor C-D plug nozzle (Model 6). The objective of these tests was to assess the influence of the suppressor on the nozzle thrust coefficient. This outer stream suppressor was chosen as an outer nozzle for the suppressed outer stream coannular plug nozzle; dual convergent-divergent (DFSC-5). Since the base pressure data obtained with the Model 6 are not documented in the Comprehensive Data Report for NAS3-22514 and, furthermore, no work effort was done to perform the similar base pressure measurements with DFSC-5 in the present program, these data are presented herein along with the above mentioned static pressure data obtained in the C-D flowpath.

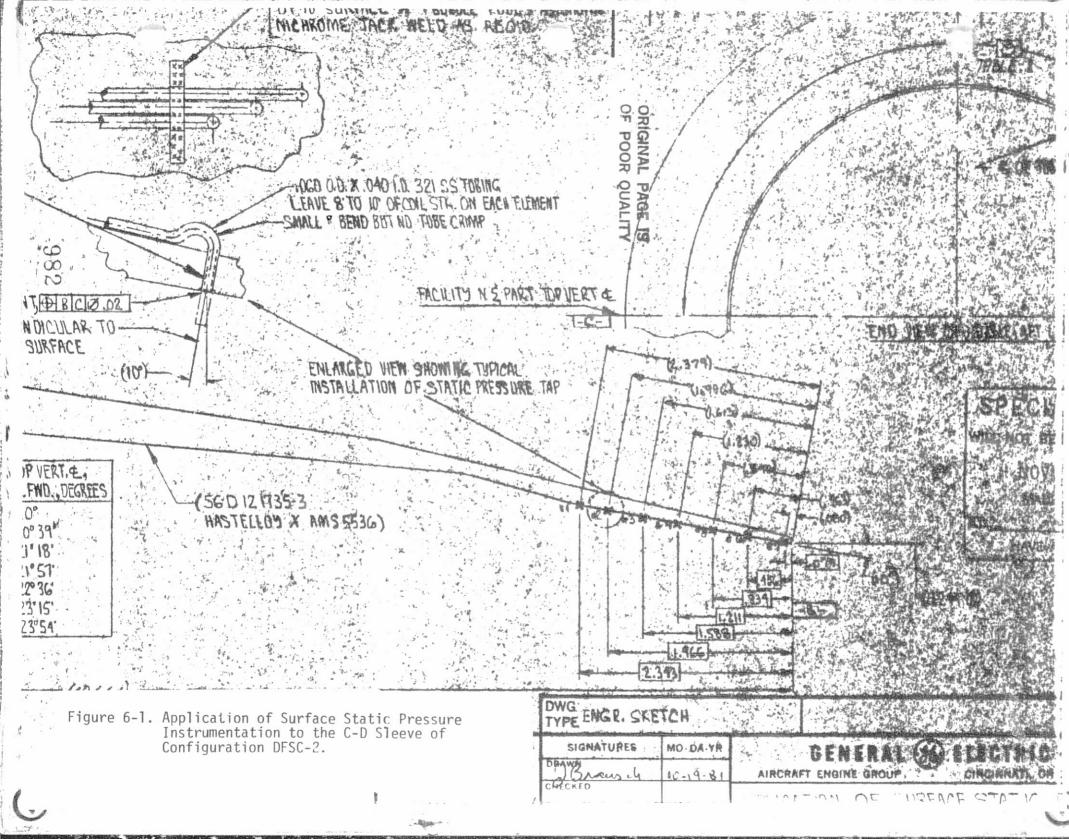
The static pressure probes, as installed on the outer nozzle sleeve of DFSC-2 and on the suppressor of DFSC-5, are shown in Figures 6-1 and 6-2.

The locations and identifications of these probes are indicated in these figures.

Tables 6-1 and 6-2 summarize the aerodynamic flow conditions for the static pressure measurements. Those data were recorded with free-jet velocities of 0, and $400 \, \text{ft/s}$.

Tables 6-3 and 6-4 summarize the static and base pressure data corresponding to the ae odynamic conditions of tables 6-1 and 6-2.

^{*&}quot;Experimental Investigation of Shock-Cell Noise Reduction for Single-Stream Nozzles in Simulated Flight", R82AEB491; July, 1982. (Reference 4-1).



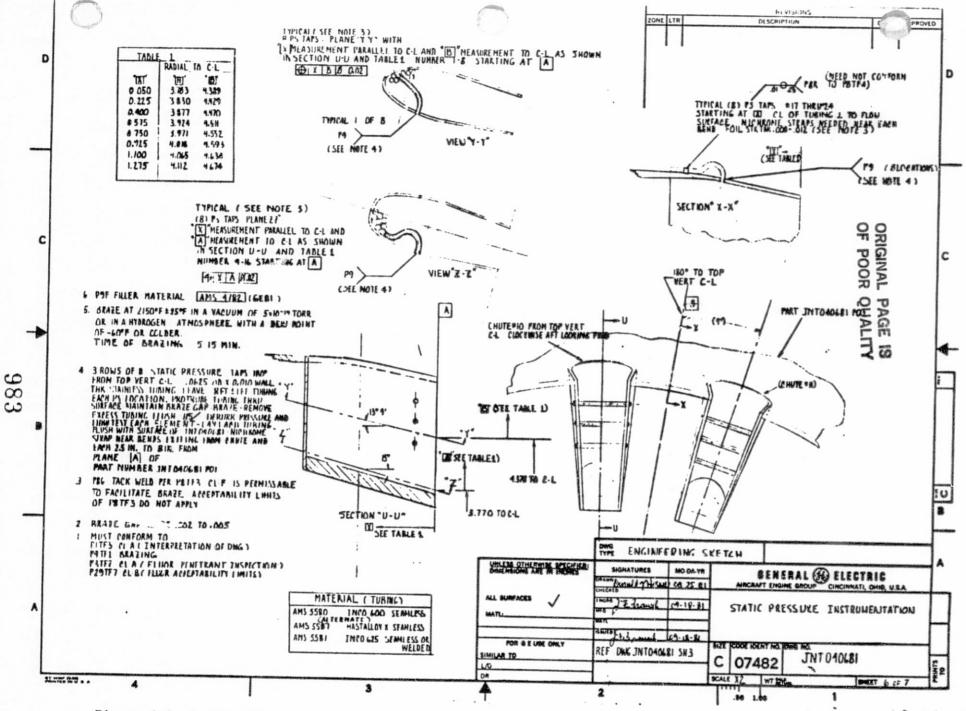


Figure 6-2. Application of Static Pressure Instrumentation to the C-D Elements of DFSC-5.

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	Test Point	P ^o r	T_{T}^{O}	v ^o j (ft/s)	Pr	TT (OR)	v ⁱ (ft/s)	v ^{mix} j (ft/s)	TTT (OR)	V _{a/c} (ft/s)	
,	201	1.00	519	0	3.13	873	1708	1708	873	0	
	205	2.22	1691	2046	3.12	856	1689	1937	1435	1	
	209	2.53	1704	2198	3.12	856	1689	2055	1466		
	211	2.81	1683	2288	3.12	857	1691	2133	1469		
	213	3.04	1695	2370	3.12	858	1691	2205	1491		
	215	3.23	1680	2412	3.12	859	1693	2245	1489		
	217	3.27	1685	2427	3.12	865	1699	2260	1497		
	219	3.32	1679	2436	3.12	862	1696	2268	1494		
	221	3.40	1687	2461	3.12	869	1702	2292	1505		
	223	3.49	1676	2475	3.12	852	1685	2302	1495		
	225	3.63	1684	2512	3.12	857	1690	2337	1508		
	227	3.82	1697	2563	3.12	860	1694	2385	1526		
	229	4.02	1708	2611	3.12	870	1703	2433	1544		
	231	3.16	1690	2400	3.12	859	1693	2233	1494		
	1219	3.40	877	1764	3.13	851	1687	1750	872	+	
	202	1.00	519	0	3.12	849	1682	1682	849	400	
	210	2.52	1708	2194	3.11	871	1703	2057	1474	i	
	212	2.77	1696	2281	3.12	869	1702	2130	1481		
	214	3.07	1702	2382	3.12	874	1707	2219	1502		
	216	3.23	1702	2429	3.12	866	1700	2260	1508		
	218	3.27	1712	2446	3.12	869	1702	2274	1517		
	220	3.33	1695	2450	3.12	873	1705	2282	1509		
	222	3.40	1691	2463	3.12	878	1711	2296	1510		
	224	3.51	1697	2495	3.12	880	1713	2326	1520		
	226	3.62	1708	2529	3.13	885	1719	2358	1534		
	228	3.81	1715	2577	3.12	872	1705	2399	1543		
	230	4.02	1696	2604	3.12	873	1706	2429	1536		
	1220	3.41	875	1763	3.13	852	1687	1750	870	4	
-					-						

Table 6-1. Summary of Aerodynamic Flow Conditions of Static Pressure Tests: DFSC-2, Coannular C-D Nozzle (Truncated Plug).

0	Test Point	P ^o r	Tr (OR)	v ^o j (ft/s)	${\tt P}_{\tt r}^{\tt i}$	TT (OR)	V ⁱ (ft/s)	V ^{mix} j (ft/s)	TTT (OR)	Va/c (ft/s)
	501	2.73	1700	2273	2.91	884	1672	2134	1512	0
	505	2.96	1727	2367	2.92	848	1639	2205	1531	
	507	3.03	1728	2389	2.92	846	1636	2224	1535	
	509	3.08	1723	2401	2.92	849	1640	2236	1534	
	511	3.13	1725	2419	2.92	852	1644	2254	1540	
	513	3.18	1710	2421	2.91	861	1648	2260	1534	
	515	3.23	1711	2435	2.91	849	1638	2271	1533	
	517	3.32	1707	2456	2.91	850	1639	2292	1534	
	519	3.52	1723	2518	2.91	867	1656	2353	1559	
	1511	3.23	877	1732	2.91	861	1651	1719	874	+
	502	2.71	1710	2272	2.91	852	1640	2122	1507	400
	506	2.96	1715	2359	2.91	848	1637	2199	1523	
	508	3.03	1716	2380	2.91	849	1637	2218	1527	
	510	3.08	1724	2401	2.90	853	1641	2238	1537	
	512	3.13	1718	2412	2.91	857	1646	2250	1536	
	514	3.18	1724	2431	2.91	856	1644	2267	1543	
	516	3.23	1724	2444	2.91	858	1646	2280	1545	
	518	3.32	1726	2470	2.91	865	1653	2306	1553	
	520	3.53	1742	2533	2.91	874	1661	2366	1576	
-	1514	3.22	876	1729	2.91	837	1627	1712	870	*

Table 6-2. Summary of Aerodynamic Flow Conditions of Static Pressure Tests: DFSC-5, Coannular Suppressor C-D Nozzle.

P_s, psia - Static

Test Point	201	205	209	211	212	T				1					
Ps Tap # 1	14.427				213	215	217	219	221	223	225	227	229	231	1219
^		13.824	19.094		23.07/	24.452	24.810	25.183	25.729	26.541	27.550	28.998	30,532	23.475	2511
2			1	17.363		11.767	20,260	20.343	21.015	21.647	22.471	23.686	x4.973	19.580	20.53
		11.473	12.989	16.344		18.490	18,163	17.078	19.444	20.070	20.854	21.954	23.164	18.145	19.57
Contract of the Party of the Pa	14.413	10.958	12.456	13.768	14.964	15.860	14.088	16.328	16.682	•	18.605	19.606	20.608	16.254	17.38
7	14.423	12.568	12.211	13.440	14.631	15.501	15.733	15.986	16.331	11.852	17559	10531		15.250	11.40
	- 1					15,010	13.26/	15.481	15.8.33	16-354	17.046	17.986	18.981		15.77
amb, psia	14.418	14.421	14.400	14.346	14.423	14.411	14.424	14.393	14.377	144,9	14.44	44202			
					· ·		11.127	17:073	79.377	14.419	14.416	14.397	14.337	14.430	14.4

P₈, psia - Simulated Flight

Cest Point	202	210	.212	214	216	218	220	222	224	226	228	230	1220*	Г
s Tap # 1	- Links	19.474	21.434	23.66/	24.957	25.207	25158	21.232	27/1/	27956	20.00			
	17.499	15.583	17.146	18.913	20.025	20.205	20514	21021	21701	27.958	22 22 /	3	26.140	
3	17.982	14.345	15.771	17.374	18.366	18.524	18.878	19.319	19.985	22.452	21.71.8	22 627	20.868	_
-	17.001	14.138	17.216	131113	10.600	16,134	17.033	17440	100211	18.553		20.780		 \vdash
	14.499	12.272	13.560	14.918	15.769	15.905	16,180	16.559	17.131	17.629	18.655	19.747	11 516	\vdash
7	14.498	11.618				15.494	15.774	16.156	16.725	17176	10749	16 11. 2	/. 7	
									/L.255°			18.843	15.821	
amb, psia	14.454	14.429	14.442	14.456	14.447	14.397	14 139	:4450	1/1/1/2	44 / 4		14.460		

^{*} With Low Temperature Outer Flow

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Table 6-4. Static Pressure Test Data for Model DFSC-5: Coannular Suppressor C-D Nozzle - Static.

	Test Point	501	505	507	509	511	513	515	517	519	1511*
	Tap # #16	14.699	15.156	15.393	15.540	15.703	15.894	14.066	16384	17.086	14.581
	#17	13.499	14.306	14.562	14.769	15007	15.236	15.448	15.770	16.620	14.577
	#18	12.970	14.007	14.279	14.492	14.733	14.999	15.260	15.592	16.354	14.313
MID-SPAN	#19	13.135	14.30L	14510	14.634	14.747	14.909	15.181	15572.	16.372	15.216
	#20	12.772	14629	14.720	14824	14923	14.753	14.791	14.911	15.213	14.525
	#21	21.239	E	The same of the sa	Same and the same	23.7/3	Control of the last of the las	-	The same of the sa	LL.858	THE PERSON NAMED IN COLUMN
	#22	27.183		6		31.227		32.199	-	34.842	
	#23	76.008	24.465	29.072	29.488	29-103	30 234	30.687	31.470	33.156	31.015
	•	The state of the language of the same of t	produce the local distance	ANNA DESCRIPTION AND DESCRIPTION OF THE PERS	THE PERSON NAMED IN			THE SECOND TO SECOND STREET	per construction year	A	-
•	#24	17.142	18.552	18.935	19.223	19.528	19.815	20.136	20.650	21.810	19.707
	#25	18.239	19.807	20255	20.577	20.914	21.248	26584	22.161	23.442	21.214
	#26	23.929	25859	26.476	26.849	27.284	27.761	28/92	28965	30.650	27.790
CHUTE HUB	#27	29.556	31.976	32.736	33.268	33.785	14.501	34.912	35883	38004	34.717
CHUTE HUB	Constitution of the last of th	30.798	33.355	34.129	and the same of the same of		Separate Sep	NAME AND ADDRESS OF THE OWNER, TH	37.377	39.576	36.154
	#29	26.594	28.763		27898	30.277	30.906	31365	32252	34.175	31.119
	#30	19.800	21468	21968		22623	23.046	23.394	24.025	25.395	22.872
	#31	17.364	18.776	19191	19.464	19.730	20.109	20.386	20.947	22.140	20.079
	#32	27.038	29.261	29943	30.443	30.898	31.417	31.915	32.807	34.744	31.540
	#33	27.384	29.628	30.308	30 818	31.276	31.772	32.316	33.207	35.148	31.855
	#34	21.807	23.593	24.128	24.515	24842	25.294	25.700	26.388	27.937	25.398
DIVERGENT	#35	15.074	16.349	16.690	16.941	17:127	17.458	17.699	1865	14.180	17.076
DIVERGENT FLAP	#36	15.369	15.352	15.351	15.351	15.353	15.339	15:352	15:353	15352	15.369
	#37	14.521	14505	14.506	18294		18913	19.214	19.685		18.726
	#38	14.824		16.333			17.164	17.449	and the same of	18938	16.996
	#39	14.521	13.622	13.910	14506	14.322	14.510	14.733	15090	15.918	14.175
	P _{amb} , psia	14 505	14.474	14 494	14483	14.420	14485	14474	14.492	14.481	14.503

^{*} With Low Temperature Outer Flow

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Table 6-4.(Concluded). Static Pressure Test Data for Model DFSC-5: Coannular Suppressor C-D Nozzle- Simulated Flight.

P _s ,	psia

	Test Point	502	506	508	510	512	514	516	518	520	1514*
	Tap # #16	14265	14.755	14.730	15075	15.196	15.397	15.545	15.818	16.441	14.633
	#17	12.994	13.854	14.169	14319	14464	14.709	14.899	15.239	15.902	14.094
	#18	12387	13.479	13.76/	140.20	14.216			15:065	15.677	14.010
MID-SPAN	#19	13.095	14.195	14.473	14693	14.824		15.169	15,500	16.205	15.243
	#20	13.137	13.896	14.200	14441	14.629	14.913	-	15.575	16.611	14.716
	#21	20592	22.619	23.186	23669	24.053	24.484	24.917	25.779	27.108	23.32/
	#22	26,271	29.021	29.728	30.298	30.794	31.346	31.888	22.771	34.648	31.373
	#23	26094	28234	28.134	29.308	29.680	30.189	30.579	31.298	32.965	

L	#24	16.761	18.257	18.654	18.998	19455	19.599	19.872	20. 12.2	21.514	19.519
L	#25	17.836	19.458	19.900	20.268	20 545	20.410	2/.25/	21.813	21/17	21.06
L	#26	23.520	25638	26.268	26.733	27.023	27.578	28.003	28.742	20.494	27.//
CHUTE HUB	#27	24.167	31.828	32.619	33.22/	33.623	24.326	34.840	25.104	17.955	24/11
	#28	30.369	33.121	33 759	34559	34996	35184	36.229	77,97	29 442	21.05
	#29	26.231	28588	29.275	29.813	30.184	30.794	31.273	32.117	24 421	31.03
	#30 [°]	19.356	21.068	21572	21.984	22 234	22.686	23.040	23.619	2503L	22.70/
	#31	16.936	18403	18.827	19.176	19.381	19.783	20.091	20.613	21.790	19.936

	P _{amb} , psia		14 459		14.511	14.150	17.300	14.581		15.584 14507	13.98 14.503
	#39	12.490	12.417	15.840	13.961	14.407	14.383	16.970	17.391	18.361	16.80
	#37	15 982	17.449	17852	18 208	18.489	18.800	19005	19.598		185
FLAP	#36	15493	15484	15.487	15.500	1550L	15 498	15.508	15.500	15.501	15.5.
DIVERGENT	#35	14.639	15910	16.302	16588	14.738	17.111	17.359	17801	18.846	16.93
	#34	21.480	23 378	23.957	24 413	24.686	25.171	25.573	26.224	27.825	25.2
	#33	27.040	29.470	30.175	30 722	31.087	31.720	32.197	33.033	35.053	31.7
	#32	26.657	29.073	29.787	30.326	30 691	31.318	31.788	32.598	34.633	31.12

^{*} With Low Temperature Outer Flow

7.0 SHADOWGRAPH TESTS

To aid in a better understanding of shock cell noise and the development of an analytical prediction model for shock noise from the coannular plug nozzle, flow visualization shadowgraph tests were conducted in addition to the laser velocimeter measurements.

A total of eighty-four (84) shadowgraph photographs were taken with twenty-one (21) plumes. Approximately half of these photographs were obtained with a free-jet velocity of 400 ft/s. In the present report, only meaningful shadow-graph photographs of sixty-two (62) are presented.

Subsection 7.1 contains the test matrix and corresponding aerodynamic flow conditions under which snadowgraph tests were conducted along with a summary of shadowgraph tests, as presented in Tables 7-1 through 7-5. Snadowgraph photographs are presented in Subsection 7.2. The shadowgraph number snown above each photograph corresponds to the "photo I.D." indicated in Tables 7-1 through 7-5.

7.1 Test Matrix and Aerodynamic Flow Conditions of Test Points

Test			Aerodynam	ic Flow Co	nditions				Summary	of Shad	dowgraph Photo Tests
Point	Pr	T _T ^o (°R)	V ^o j (fps)	P _r i	T _T i (°R)	v; (fps)	Vac (fps)	Photo	Shadows Photo (Local x (in.)	tion	Flow Field Covered by Shadowgraph Photos
119	3.32	1686	2441	3.12	855	1688	0	29 30 32	-7.44 -0.01 3.46	-	30 32
120	3.33	1699	2452	3.13	869	1703	400	20 22 23	-6.85 0.45 3.95	3.27 3.27 0	22 23
1119	3.41	864	1753	3.13	844	1680	0	7 9 10	-7.55 3.85 12.05	3.41 0 0	9 10
1120	3.41	880	1768	3.13	866	1701	400	12 13 15 17	-7.55 0.65 4.05 12.35	3.52 3.52 0	13 15 17

Test			Aerodynami	c Flow Cor	nditions						owgraph Photo Tests
Point	Pr	Trong (°R)	v ^o (fps)	P _r i	T _T i (°R)	V ⁱ (fps)	V _{ac} (fps)	Photo I.D.	Shadowg Photo C Locat x (in.)	raph enter ion y (in.)	Flow Field Covered by Shadowgraph Photos
5119	3.408	878	1766	1.609	1085	1289	0	3 4 5	-7.45 0.65 4.25	3.44 3.44 0	3 4 5

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Test		an germanikan menentuari era di anteriori era del	Aerodynam	ic Flow Co	nditions				Summary o	of Shad	lowgraph Photo Tests	
Point	P _r ^o	T _T O	v ^o j (fps)	P _r i	T _T i (°R)	v ⁱ (fps)	V _{ac} (fps)	Photo	Shadowgr Photo Co Locat x (in.)	ion	Flow Field Covered by Shadowgraph Photos	
219	3.32	1679	2436	3.12	862	1696	0	8 9 11	-3.76 3.25 4.03	3.06 3.06 0	8 9 11	
220	3.33	1695	2450	3.12	873	1705	400	14 15 16	-3.76 3.25 4.03	3.06 3.06 0	14 15	OF POOR QUALIT
1219	3.40	877	1764	3.13	851	1687	0	4 5 6	-3.97 2.19 3.60	3.03 3.03 0	5 6	7
1220	3.41	875	1763	3.13	852	1687	400	17 18 19	-3.97 2.19 3.60	3.32 3.32 0	17 18	

			Aerodynami	ic Flow Cor	nditions						owgraph Photo Tests
Test Point	P _r ^o	T _T O (°R)	v ^o (fps)	P _r i	T _T i (°R)	V ⁱ (fps)	V _{ac}	Photo I.D.	Shadowg Photo C Locat x (in.)	raph enter ion y (in.)	Flow Field Covered by Shadowgraph Photos
5219	3.415	557	1408	3.146	862	1700	0	21	-4.96	0	21
											OF POOR
											PAGE 18

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Table 7-3.

Test Details of Shadowgraph Photographs with Coannular C-D Nozzle (Extended Plug; DFSC-3).

Test			Aerodynau	ic Flow Co	onditions				Summary	of Shac	dowgraph Photo Tests
Point	P _r ^o	T _T O(°R)	v ^o (fps)	Pr	T _T i (°R)	v ⁱ j (fps)	V _{ac}	Photo I.D.	Shadow Photo Loca x (in.)	graph Center tion y (in.)	Flow Field Covered by Shadowgraph Photos
319	3.32	1688	2442	3.13	861	1696	0	28 29 31 33	-6.52 -0.36 1.05 8.13	3.17	28 29 33
320	3.33	1698	2451	3.13	875	1710	400	34 35	-6.52 1.05	3.17	OF POOR
1319	3.42	871	1761	3.12	854	1688	0	22 23 25	-7.01 -0.93 0.49	3.00 3.00 0	22 23 25 WALTY
1320	3.42	878	1767	3.13	856	1692	400	36	-7.01	3.37	36

Table 7-4.

Test Details of Shadowgraph Photographs with Coannular Suppressor Convergent Nozzle (DFSC-4).

Test			Aerodynam	ic Flow Co	onditions				Summary	of Shac	lowgraph Photo Tests
Point	P ^o r	Tr (°R)	V ^o j (fps)	Pr r	T _T i (°R)	V ⁱ j (fps)	V _{ac} (fps)	Photo I.D.	Shadow Photo Loca x (in.)	graph Center tion y (in.)	Flow Field Covered by Shadowgraph Photos
415	3.14	1715	2411	2.90	872	1658	0	14 15 16	-6.38 0.70 2.19	3.74 3.74 0	14 15
416	3.14	1708	2407	2.91	866	1654	400	11 12 13	-6.02 1.05 2.19	3.74 3.74 0	ORIGINAL OF POOR
1415	3.22	844	. 1687	2.90	848	1634	0	3 4 5	-6.31 0.91 2.54	3.55 3.55 0	QUALITY OUALITY
1416	3.22	871	1725	2.91	846	1634	400	7 8 9	-6.38 0.84 2.89	3.55 3.55 0	7 8 9

996

Table 7-5. D

Details of Shadowgraph Photographs with Coannular Suppressor C-D Nozzle (DFSC-5).

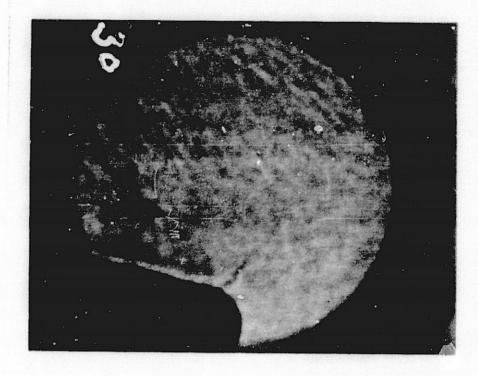
			Aerodynam	ic Flow Co	nditions						owgraph Photo Tests
Test Point	P _r ^o	T _T O (°R)	v ^o (fps)	P _r i	T _T i (°R)	v ⁱ (fps)	V _{ac} (fps)	Photo	Shadowg Photo C Locat x (in.)	ion	Flow Field Covered by Shadowgraph Photos
511	3.13	1725	2419	2.92	852	1644	0	28 29 30 31	-5.53 0.84 2.82 -4.75	3.53 3.53 0 0	28 29 31 30
512	3.13	1718	2412	2.91	857	1646	400	25 26 27	-5.39 0.91 2.47	3.58 3.58 0	OF POOR OF
1511	3.23	877	1732	2.91	861	1651	0	17 18 19	-5.10 1.90 3.53	2.92 2.92 0.26	17 18 19 VALTY
1514	3.22	876	1729	2.91	837	1627	400	21 22 23	-5.17 1.12 3.32	2.66 2.66 0	22 23

RE

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7.2 Shadowgraph Test Results

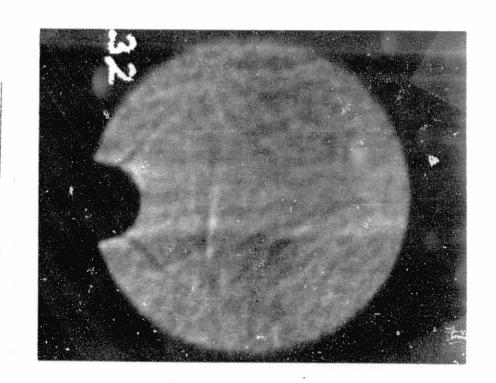
7.2.1 Shadowgraph Photos of DFSC-1

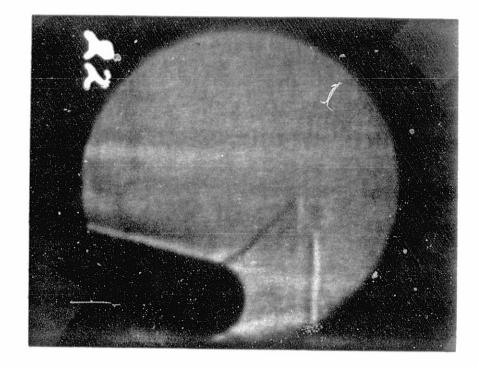


Configuration / Test Point // Shadowgraph No.

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Test Point
Shadowgraph No.

Shadowgraph No.



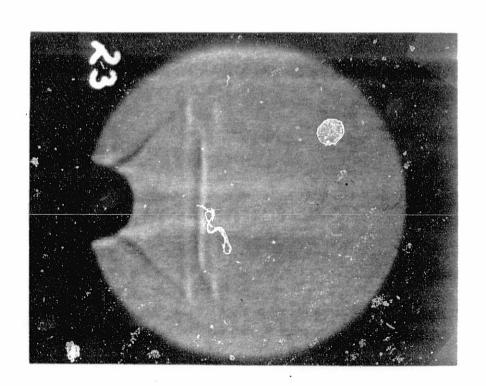


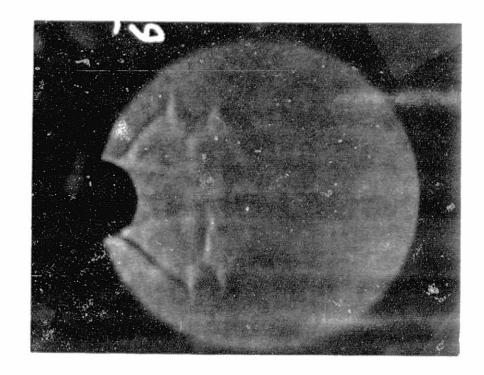
Configuration
Test Point
Shadowgraph No.

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Configuration
Test Point
Shadowgraph No.

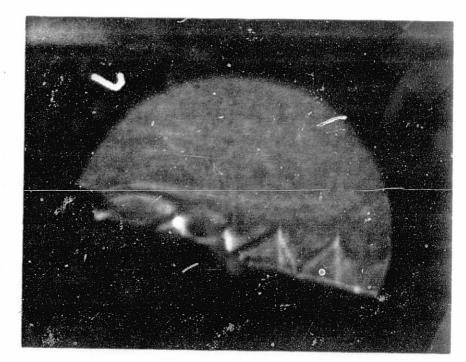
Shadowgraph No.





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Shadowgraph No.

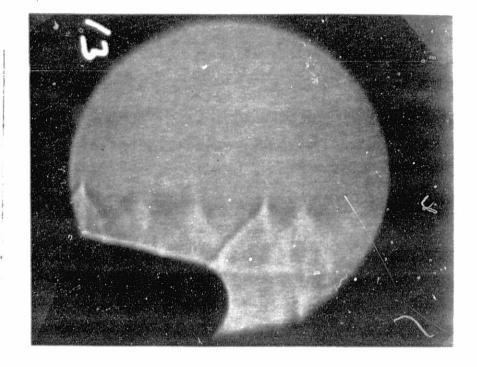


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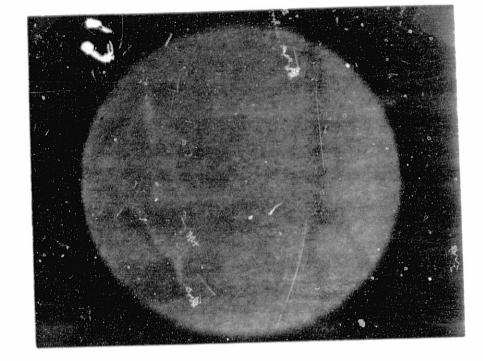
Configuration Test Point

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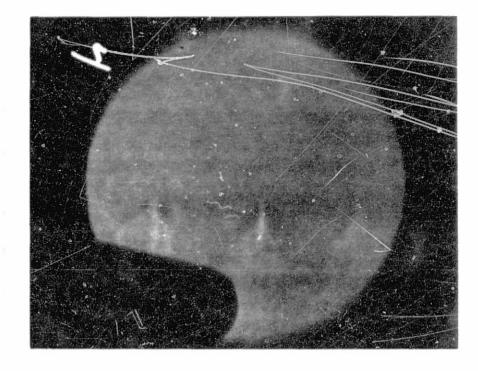
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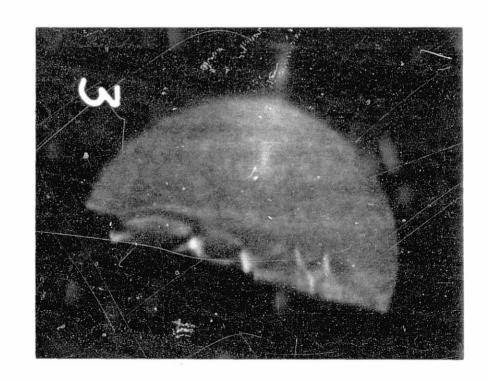
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Test Point
Shadowgraph No.



Configuration Test Point // C



Configuration / Test Point Shadowgraph No.



Configuration / Test Point Shadowgraph No.

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C-6

Configuration Test Point

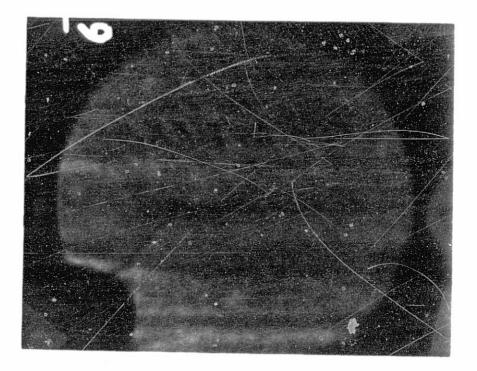
Shadowgraph No.

Shadowgraph No. Configuration Test Point

1600

7.2.2 Shadowgraph Photos of DFSC-2

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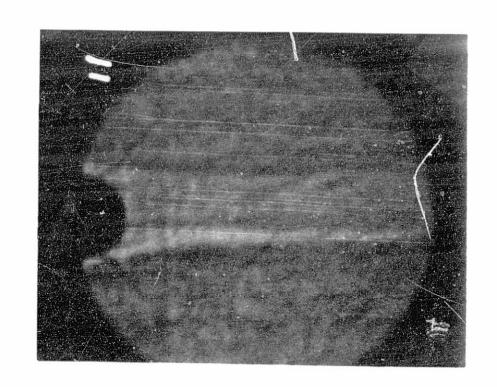


Configuration
Test Point
Shadowgraph No.

1 No.

Shadowgraph No.

Configuration Test Point





Configuration
Test Point

Shadowgraph No.

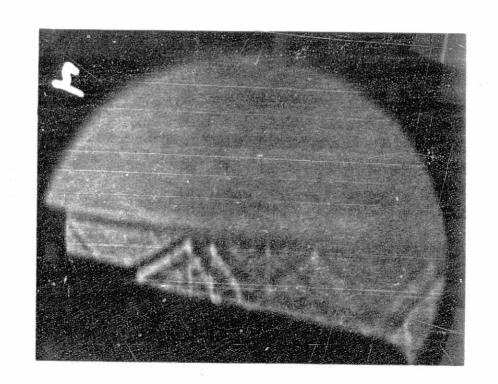
Configuration Test Point

Shadowgraph No. Configuration Test Point



Configuration Test Point

Shadowgraph No.



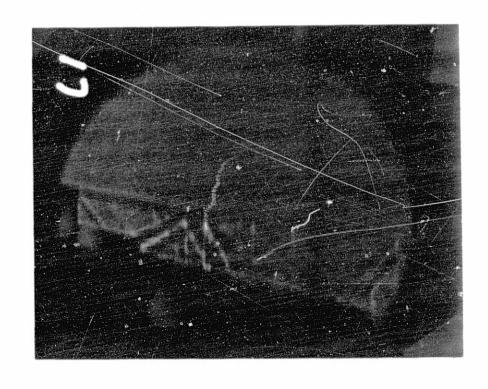
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Test Point
Shadowgraph No.

Shadowgraph No.





Configuration
Test Point
Shadowgraph No.

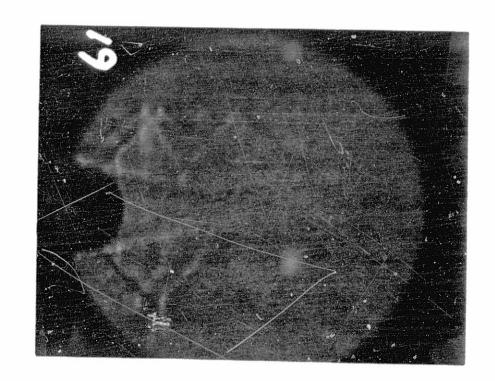


Configuration
Test Point
Shadowgraph No.

Configuration Test Point

Shadowgraph No.

Shadowgraph No.



oint graph No.

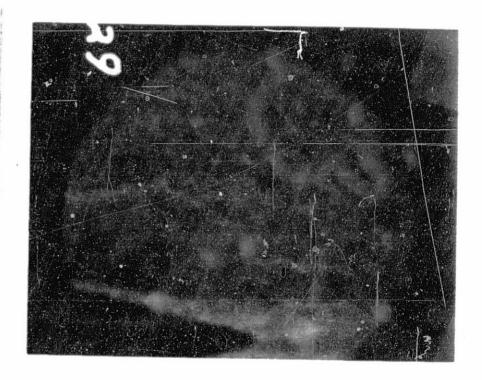
Shadowgraph No.

Configuration Test Point

7.2.3 Shadowgraph Photos of DFSC-3

Configuration 3/9
Test Point 3/9
Shadowgraph No. 28

Shadowgraph No.







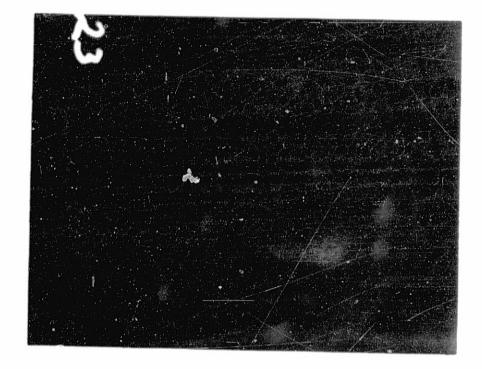
Configuration 3 Test Point 3/5 Shadowgraph No. 33



Configuration 3
Test Point 520
Shadowgraph No. 35

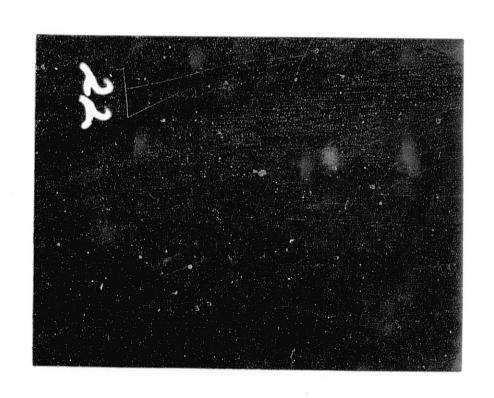


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Configuration 3
Test Point 3/9
Shadowgraph No. 23

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Configuration 3
Test Point /3/9
Shadowgraph No. 25

Configuration
Test Point
Shadowgraph No.



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Test Point 1320
Shadowgraph No. 36

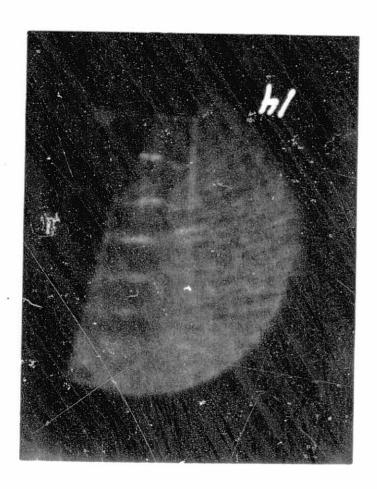
Shadowgraph No.

Configuration Test Point

7.2.4 Shadowgraph Tests of DFSC-4

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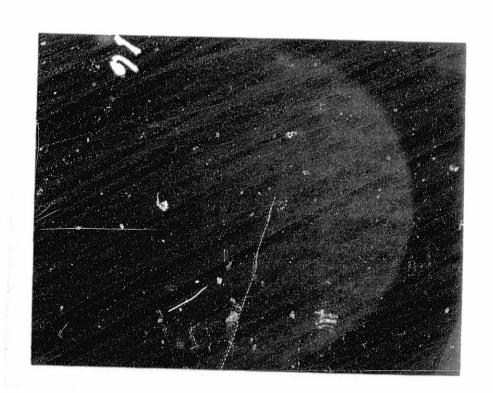
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Test Point 4/5
Shadowgraph No. 15





Configuration
Test Point
Shadowgraph No.

Configuration 4
Test Point 4/5
Shadowgraph No. / C



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Configuration 7
Test Point 4/6
Shadowgraph No. 72

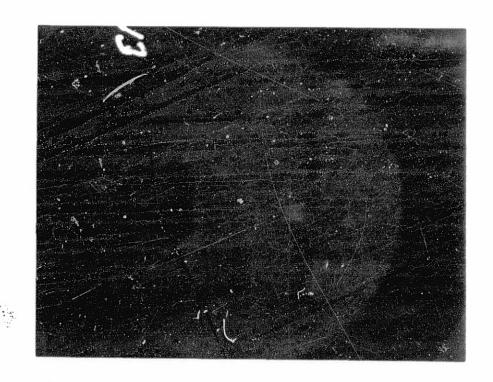
Configuration Fest Point Shadowgraph No.

Configuration Y Test Point 7/6
Shadowgraph No. /3

Shadowgraph No.

Configuration Test Point

()



Configuration
Test Point /4/5

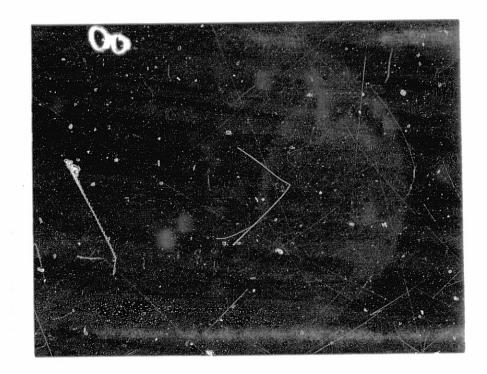
Configuration
Test Point /4/5
Shadowgraph No.

Configuration Test Point

Shadowgraph No.

Configuration
Test Point
Shadowgraph No.





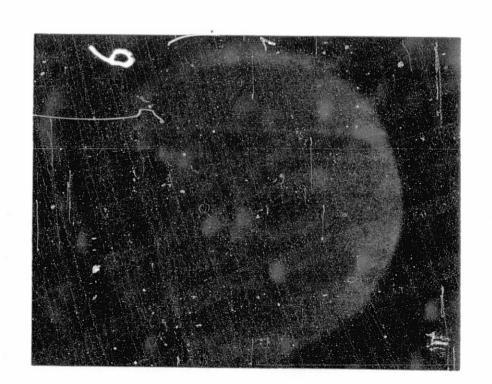
Configuration 4
Test Point /4/2
Shadowgraph No.



Configuration
Test Point
Shadowgraph No.

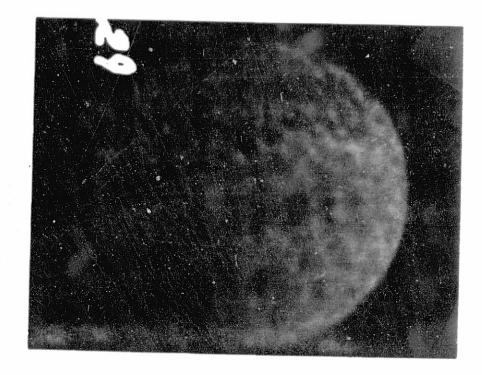
Configuration Test Point

Shadowgraph No.



7.2.5 Shadowgraph Tests of DFSC-5

· ...

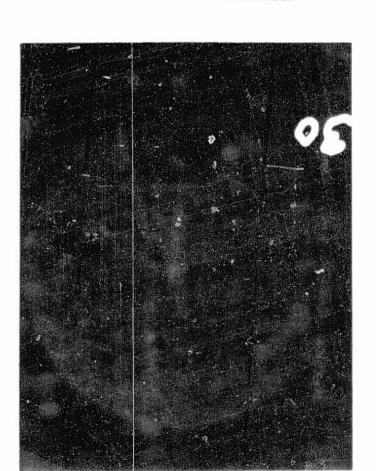


Configuration 577/
Test Point 57//
Shadowgraph No. 25

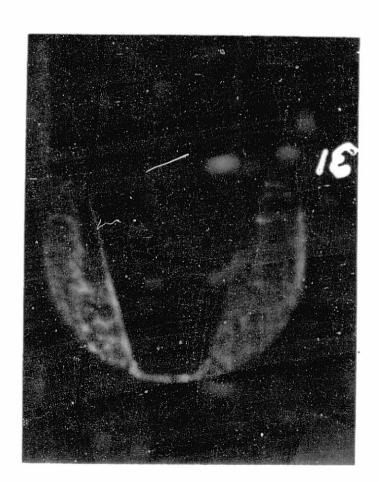
Configuration
Test Point
Shadowgraph No.

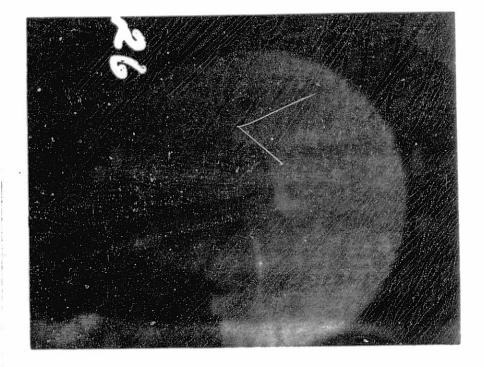


Configuration	3
Test Point_	344
Shadoweraph No.	20

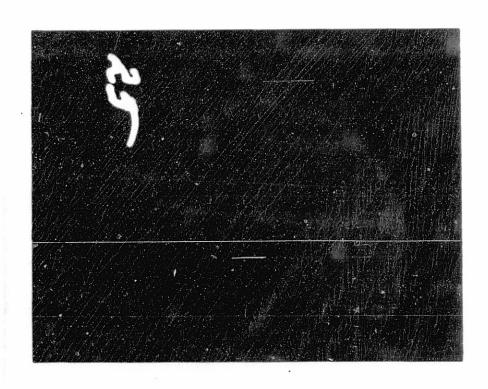


Configuration 5
Test Point 5//
Shadowgraph No. 3/





Configuration 5 Test Point 5/2 Shadowgraph No. 36



Configuration 5
Test Point 5/2
Shadowgraph No. 25

Configuration
Test Point
Shadowgraph No.

Configuration 5/2
Test Point 5/2
Shadowgraph No. 27



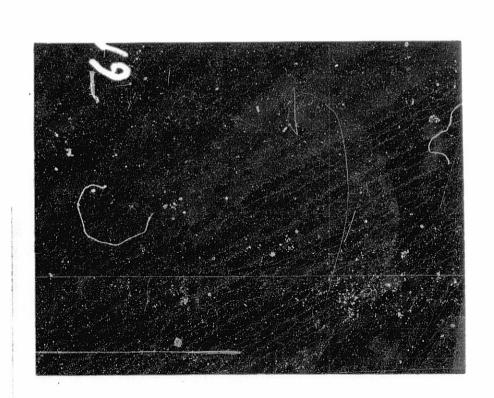
Configuration 5
Test Point 51
Shadowgraph No. 18

Configuration
Test Point
Shadowgraph No.

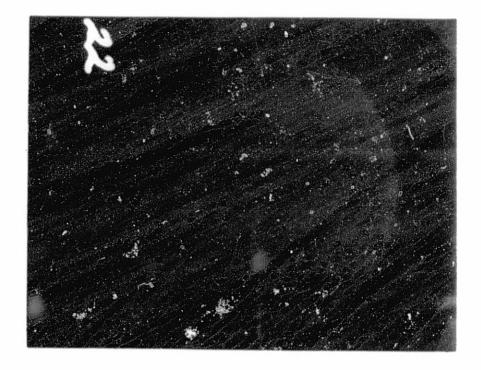


Shadowgraph No.

Configuration Test Point



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Configuration ST Test Point 15/X Shadowgraph No. 22

C

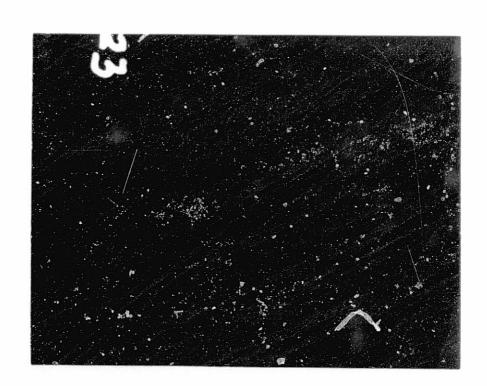


Configuration ST Test Point 15/4
Shadowgraph No. 2/

Configuration Test Point Shadowgraph No.

Shadowgraph No. 2-5

Configuration Test Point



8.0 NOMENCLATURE

Cross-Sectional Area Speed of Sound C-D Convergent-Divergent CDR Comprehensive Data Report Diameter Thrust Reference Thrust, 5130 pounds Annular Step Height Shock-Cell Spacing Mixed Shock Strength Parameter, 10 log $\beta^{\mbox{eff}}$, Refer Table 3-1 for Definition LBM LV Laser Velocimeter Mixed Velocity Parameter, 10 log V_i^{mix}/a_{amb} , Refer Table 3-1 for Definition LVM Μ Mach Number NF Normalizing Factor, Defined in Table 3-1 OASPL Overall Sound Pressure Level OAPWL Overall Sound Power Level Pressure Defined = P/P_{amb} Defined in Table 3-1 Perceived Noise Level PNL Normalized PNL, Defined as PNL - 10 log (F/F_{ref}) $(\rho/\rho_{amb})^{\omega-1}$ PNLN Tone Corrected Perceived Noise Level PNLT RH Relative Humidity Radius R' Slant-Traverse Radial Coordinate SPL Sound Pressure Level Temperature Ideally Expanded Velocity W Mass Flow Rate X Axial Distance χı Axial Distance Measured Along Plug Surface

Z, Z' Radial Distance in N-S Direction Effective Shock Strength Parameter Y Specific Heat Ratio Angle Measured Relative to the Inlet Centerline Divergent Flap Angle/Plug Angle Density Density Exponent

SUBSCRIPTS

ac, a/c Aircraft

amb Ambient Conditions

eq Equivalent

j Based on Ideal Jet Conditions

r Ratio

s Static

T Stagnation Condition

SUPERSCRIPTS

i Inner
o Outer
mix Fully Mixed Conditions

9.0 REFERENCES

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- 2-2 Janardan, B.A., et al, "Free Jet Investigation of Mechanically Suppressed High-Radius-Ratio Coancular Plug Model Nozzles", Comprehensive Data Report, Volume I, Test Nozzles and Acoustic Data, R81AEG484, May, 1981.
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- 2-4 Bediako, E.D., Yamamoto, K., "Aerodynamic Design and Analysis for Shock Cell Noise Reduction System", General Electric Company, R81AEG543, September, 1981.
- 2-5 General Electric Company, Proposal for "Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight", P81-35 in Response to NASA RFP3-378160, April, 1981.
- 4-1 Yamamoto, K., et al, "Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight", Comprehensive Data Report, Vol. I, II and III, NASA CR-168234, July 1982.
- 4-2 Shields, F.D. and Bass, H.E., "Atmospheric Absorption of High Frequency Noise and Application to Fractional-Octave Bands", University of Mississippi, NASA CR-2760, June 1977.